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THE OPISTHOBRANCHIATA OF SOUTH AFRICA.

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(With fourteen Plates)

The number of Opisthobranchiata hitherto known from the coast of South Africa is very small. Krause described a *Pleurobranchus granulatus*, Vayssi  re a *Pleurobranch  a capensis*, Rang a *Melibe rosea*, Stimpson a *Tritonia pallida* and a *Triopa lucida*.

The investigations of late years of the Cape Government, carried out under the direction of Dr. Gilchrist, have considerably augmented the number, and have furnished the material for the following report.

The East and South Coasts of South Africa are washed by a prolongation of the great equatorial current from the Indian Ocean; the West, on the contrary, by the cold Antarctic current. Sometimes, however, it happens that the warm Agulhas current passes up this side, while at other times the cold Antarctic current passes further to the East.* In general there is a marked difference

* Gilchrist, "Observations on the Temperature and Salinity of the Sea around the Cape Peninsula." Mar. Inv. I., 1902, pp. 181-216.

Gilchrist, "Currents on the South African Coast, as Indicated by the Course of Drift Bottles," part ii. 1904, pp. 155-166.

between the fauna of the West side of the Cape of Good Hope Peninsula and that of the East. The latter has more of a tropical Indian character, the former a somewhat more Northern, although typically tropical forms of Nudibranchiata (*e.g.*, the *Melibe*) are not wanting.

TECTIBRANCHIATA.

ANASPIDEA.

APLYSIIDÆ.

APLYSIIDÆ PROPRIÆ.

I. APLYSIA, L.

Linné, *Syst. Nat.*, ed. xii., 1767, p. 1072.

Cuvier, *Tableau Elém.* (1798) an v., p. 386, pl. ix., fig. 3.

Lamarck, *Syst. des Anim.* s.v. 1801, p. 62.

R. Bergh, *Die Opisthobranchiata der Siboga Expedition*, 1905, p. 3.

1. APL. GILCHRISTI, B. n. sp.

Animal colore brunneo albo-maculato.

Pl. I., figs. 1-3 ; Pl. X., fig. 1.

A living specimen was procured in False Bay in February, 1905 (Pl. X., fig. 1). It was brown in colour, the sides of the foot with many small white spots and white border, the outer border of the wings with larger white blotches, and many fine black perpendicular lines on their outer side. It swam dexterously and at a fair speed through the water.

The animal, in a contracted condition (preserved in formalin), had a length of 6.5 cm. and, with raised parapodia, a height of 3 and a breadth of 2.5; the breadth of the head (with its 7 mm. long tentacles) 2 cm., the height of the rhinophores 6 mm., the length of the mantle-shield 2.5 cm., its breadth 2, the length of the siphon 1, the breadth of the foot proper (sole) 9 mm., the length of the tail 8, the length of the foot-wings 4 cm., with an inside height of 1.7.—The colour of the sole of the foot is blackish brown with a whitish margin, the animal otherwise of a dark brown colour, whitish rather elongate spots on the sides of the body, some also on the outside of the wings and a series of larger blots along the margin, the inside of the wings of the same brown colour with a few whitish spots towards

the whitish margin, the mantle and the siphon of somewhat brighter brownish colour with spread roundish whitish spots.

The animal has large, rather flattened tentacles, the sole of the foot not narrow, with distinct margins, the wings high, meeting behind and connecting with the tail; on the mantle no aperture could be detected, the somewhat grayish gill 22 mm. long by a height of 10 and a thickness of 6, nearly its half freely projecting, the number of groups of lamellæ about 15.

The *shell* 2.3 cm. in length with a breadth of 2 and a height of about 0.5; of quite usual form, with a thin calcified, very fragile layer and a rather large cuticular margin.

The eyes of a diameter of about 1 mm.

The length of the mouth tube 3 mm. The *bulbus pharyngeus* grayish, 9 mm. long, with a height and a breadth of 6. The mandibular plates larger, meeting above and beneath, 4.5 mm. high with a breadth of 2.25; their full anterior half black brownish, the rest yellowish; their staff-formed elements up to at least 0.2 mm. high by a diameter at the slightly thickened upper end of 0.016. The gray palate as usual, its plates with the usual thin hooks of a height of up to at least 0.2 mm. The brownish yellow rasp of the broad tongue containing about 36 series of plates, in the short and thick sheath 10 series, the total number thus being 46; in the series up to 33 plates. The plates in the thicker parts yellow; the breadth of the median 0.28 mm.; the 4 outermost measured 0.08–0.12–0.18, and 0.25 mm., the length then rising to 0.35 by a height of 0.24 mm. The median plate (Pl. I., fig. 1) not broad, with finely denticulated hook and two denticles at its root. The two outer plates (fig. 2a) without hook, the next with a small single one, the following with denticular hook (fig. 2). The plates otherwise of the usual form, with pointed finely denticulated hook and a stronger denticle towards its root or (on the outside) with 2–4 (fig. 3).

The long thin white salivary glands as usual.

The black oesophagus 10 mm. long by a breadth of 1.25. The first stomach nearly colourless, 14 mm. long by a diameter of 10, empty. The *masticatory stomach*, brownish gray, 8 mm. long by a diameter of 6, two series of rather low thorns before the cardia, the facets of the stomach as usual, with 8 larger and about 6 smaller plates, the larger of about the same size, of a height of 3.5 mm., dirty yellow, the smaller paler, less regularly pyramidal. The third stomach 5 mm. long and broad, without facets, as it were.

The brownish gray conical *liver* 14 mm. long by other diameter of 9, the end of the long (about 4 mm.) gall-bladder freely projecting on the surface of the liver.

The yellow *hermaphrodite gland* covering the end and the hinder upper side of the liver with a layer 4 mm. thick, 8 mm. long, and 7 mm. broad, its duct long and strong. The yellowish white and grayish anterior genital mass as usual, the grayish globular spermatheca 6 mm. in diameter. The brownish gray *penis* 11 mm. long by a diameter of 2.25, nearly cylindrical, the inside of the *præputium* with strong blackish longitudinal folds; the white glans 7 mm. long, very pointed, somewhat turned, with rather deep furrow.

2. APL. ALLOCHROA, B. n. sp.

Pl. I., figs. 4-10.

Two individuals of nearly the same size were caught at Knysna at low tide on the shore between the jetty and the village. One of them gave off a good deal of red pigment.

The length was 25 mm. with a breadth of 10 and a height of 11, the oval mantle 12 mm. long, its round hole of a diameter of 8, the siphon 4 mm. long by a breadth of 3, the length of the somewhat flattened gill 5 with a breadth of 2 mm.; the foot 4 mm. broad, the wings 13 mm. long, their height (on the inside) 5, the length of the tail 4. They were one-coloured, yellow, merely the cleft of the rhinophores and the tentacles black and on the free inner margin of the foot-wings a series of small black spots, the gill slightly brownish.

The skin quite smooth all over. The foot-wings coalescent behind. The under-side of the mantle brim brown, richly provided with small glands. The shell (fig. 4) very difficult to see and to loosen, 11 mm. long with a diameter of 9, very flattened, very thin cuticular, with small nucleus, without any trace of calcification, nearly colourless.

The central nervous system as usual.

The *bulbus pharyngeus* dirty yellowish, 5 mm. long with a breadth of 3.5 and a height of 3; two grayish, as it were, palate plates shone through the roof of the mouth cavity, but no trace of armature could be detected. The longish triangular mandibles brown, anteriorly nearly black, 1.75 mm. high by a breadth up to 1, their elements (fig. 5) up to 0.18 mm. in height by a diameter of 0.009. The rasp of the tongue yellowish brown, containing 22 rows of plates, in addition 15 in the sheath, the total number of the series thus being 37; about 20 plates in the rows. These last with exception of the 2.3 outer brownish yellow; the length of the 6 outer (fig. 8) was 0.06-0.08-0.1-0.12-0.18-0.25, and seemed not to become higher, the breadth of the median plates 0.35 mm. These last (fig. 6) with

finely denticulated hook and at the base of this two pointed denticles. The first lateral plates (fig. 7) with strong hook finely denticulated on the margins and at its base two strong denticles. On most of the lateral plates the margins of the hook were even, but at its base two pointed denticles on each side; the 4-5 outer (fig. 8) had no hook.

The salivary glands as usual.

The first stomach 8 mm. long by a diameter of 7, at its pylorus two series of irregularly roundish facets. The masticatory stomach brownish, of a diameter of 3 and a length of 2.5 mm., showing 9 larger and 4 smaller plates, all yellow, the first up to 1.5 mm. high, of the usual pyramidal form, the later partly more conical (fig. 9). The third stomach 2 mm. long, around its cardiac opening a few rounded tubercles; but no thorns could be found. The liver brownish gray, sackformed, 10 mm. long by diameter of 6.

The *hermaphrodite gland* in colour scarcely differing from the liver, in the male and female lobules ripe genital elements. The somewhat compressed anterior genital mass about 5 mm. long, whitish and yellowish, the sperm-oviduct 6 mm. long. The penis (fig. 10) straightened out 6 mm. long, yellowish, the white glans in its hinder end 1 mm. long, to its posterior end a small prostata gland seemed affixed (fig. 10).

This form represents perhaps a new species.

3. APL. GARGANTUA, B. n. sp.

Pl. I., figs. 11-21; Pl. II., fig. 1.

One individual was taken on the beach at Simon's Town (2.11.99).

Preserved in formalin it had a length of 18 cm. by a breadth of 7.5 and a height of 6.7 cm., the length of the side of the head from the mouth to the end of the tentacles 3 cm. (on each side) by a breadth of 1.8, the tentacles and the rhinophores 7 mm. long. The mantle 7.5 cm. long by a breadth of 4.5, its siphon 2.8 cm. long with a breadth of 1.8. The gill is of a length of 4 cm. with a height of 2.2, and a breadth of 2, the number of tufts of lamellæ on each side about 15. The foot-wings (parapodia) reaching from the region behind the rhinophores to the tail, the height of the wings on the inside up to 3.5 cm.—The ground colour of the whole of the back with the wings and mantle clear brownish gray with very many irregular rather large white spots, the upper half of the inside of the wings coloured in the same way here as on the mantle, the spots often confluent in large patches, the lower part of the inside of the wings whitish, the sides of the body grayish, the foot dirty yellowish white.

The form of the animal as usual, the fore end of the head rather large, the tentacles proper and the rhinophores rather small, the male genital opening at the root of the (right) head-wing (about 9 mm. from the mouth). The seminal furrow very distinct, the vulva rather thick. The mantle a little convex, without hole (to the shell); the posterior third of the gill freely projecting, the anal aperture flat, the branchio-pericardial on usual place. The margin on the foot-wings finely crenulated, the foot rounded anteriorly, with pronounced marginal furrow.

The shell measured (floating in water) 6 cm. in length by a breadth of 4, the height was about 7 mm.; it was quite cuticular, somewhat yellowish, without trace of calcification, the nuclear part very small (fig. 11).

The cavity of the body extends to the root of the tail.

The central nervous system as usual.

The mouth tube 8 mm. long, grayish, darker on the inside. The *bulbus pharyngeus* 17 mm. long with a breadth of 13 and a height of 12 mm., whitish with gray palate, the thick rasp-sheath forming a prominence on the under side. The mandibles 9 mm. high with a breadth of 4.5 and a thickness of about 0.3, the posterior margin convex, the anterior somewhat concave; the colour brownish yellow, the anterior half darker; the elements high, rather straight, up to 0.3 mm. long (fig. 12) with diameter of 0.007 mm. The median part of the palate as usual, the thorns of the lateral parts thin, colourless, somewhat bent, of a height up to 0.20 mm. (fig. 13). The large tongue with brownish yellow rasp; the whole organ was so hardened that a proper examination was impossible; the rasp contained perhaps about 30 and the sheath about 12 rows of plates. The median plates could not be seen; the length of the body of the six outer laterals was 0.04–0.08–0.10–0.20–0.25 and 0.30 mm., and did not seem to be more; that of the innermost scarcely exceeded 0.25 mm.; the colour of the plates yellow. The lateral plates (figs. 14–16) nearly of the usual form, with long pointed hook, whose inferior half bore denticles, larger on the outer margin, the upper half with some very fine denticles. The outer plates are much smaller, nearly or quite reduced to the basal plate (fig. 15a).

The salivary glands a little depressed, yellowish white, about 4 cm. long, with a breadth in the anterior part of 2 mm., their duct very short.

The oesophagus (Pl. II., fig. 1a) rather dark gray, 2 mm. long with a breadth of 5. It dilates suddenly in (fig. 1b) the anterior stomach, which is somewhat bent, before smooth, and with some (5) strong circular bands. The length of this rather stiff, somewhat cylindrical

stomach was 3.5 cm. with a diameter of 1.6 (the gray folds of the œsophagus continued through the foremost part of the stomach. Its cavity was filled with long, whitish, somewhat ramified threads of an alga of a diameter mostly of 0.5–0.75 mm.). The second, masticatory stomach 1.3 cm. long by a diameter of 2 (fig. 1c); in the cardia a belt of smaller plates, set in 3–5 irregular quincunx-series (figs. 17, 18); behind these the two series of larger plates (fig. 17b); these last of a dirty brown colour, mostly of the pyramidal form, sometimes (fig. 18) more hornlike, rising to a height of 8 mm.; the plates of the cardial belt smaller, less regular, sometimes pointed-conical rising to a height of 4 mm. The third stomach (fig. 1d) 2 cm. long by a diameter of 2.3, its wall thinner than that of the two other; it passes immediately in the intestine (fig. 1e), which has a diameter of 7.5 mm., and as usual runs in the surface of the liver.

The liver blackish gray, black in section, 4.5 cm. long by a height of 3 and a breadth of 3.5 cm.

The hermaphrodite gland placed obliquely on the hinder end of the liver whitish, of a breadth of 3 cm., with a height of 2, and a thickness up to 1.2 cm., rather smooth on the free side; in the lobules ripe genital elements. The duct rather short, of a diameter of 4 mm., forming an ampulla with short windings, extending along the whole side of the anterior genital mass. The anterior genital mass large. The muco-albuminous mass oviform, of a length of 20 by a diameter of 11 mm., yellowish in the posterior two-thirds, with some (4) grayish spirally circular bands. The strong, nearly cylindrical spermoviduct nearly as long as the whole gland by a diameter of 8 mm., the under half brown, the upper yellowish. The spermatheca globular, of a diameter of 9 mm., its duct a little longer. The penis a little bent (Pl. I., fig. 19), 15 mm. long, at its hinder end a strong retractor. This hinder end globular, of 3 mm. diameter, whitish; the rest, the præputium, 12 mm. long, grayish. The inside of the præputium darker, with longitudinal folds, of which two stronger are continued in the furrow of the glans; from the bottom of the præputial cavity projected (fig. 20) the pointed head of the glans, showing a furrow, which is continued up into the small cavity of the rest of the glans (fig. 21); in retracted state of the penis situated behind the præputium (fig. 19a), it did not show any glandular structure.

This form may represent a new species.

4. APL. LOBATA, B. n. sp.

Pl. II., figs. 8-12.

One specimen was procured from Woodstock beach (Table Bay); it was preserved in a rather contracted condition.

It was 3 cm. long with a breadth of 2·5 and a height of 2; the length of the mantle shield 2·3 with a breadth of 1·7, the length of its hole 6 mm., the siphon about 8 mm. high with a breadth of 10, the height of the foot-wings (on the inside) 14 mm., the breadth of the foot 9 mm. The animal was dirty yellowish white in colour.

The foot-wings with grossly undulated margin. They both showed at about the middle of their length a perpendicular fissure with a smaller one before and behind. They coalesced posteriorly, and in front nearly covered the head with a prominent lobe 8 mm. long. The mantle very large and prominent; the gill bent, 13 mm. long, with a breadth of 7 and a thickness of 4. The whole body was quite smooth.

The shell (fig. 8) of usual form, 2·2 cm. long with a breadth of 1·7, very thin, its calcareous layer broken in many small pieces.

The foot-wings were of curious form, lobed and both so symmetrical that it scarcely could be by mutilation. The gill with about twelve compound pairs of lamellæ, the last third freely projecting, the anus and the renal pore very distinct.

The *bulbus pharyngeus* 8 mm. long with a breadth and a height of 6; the mandibular plates 1·5 mm. broad, dirty yellow, their elements (fig. 9) somewhat bent, of a height up to 0·22 mm. with a diameter of 0·013, a little flattened at the point. The palate thorns erect, plump, of a height up to 0·06 mm. The brownish yellow rasp of the tongue contained 32 series of plates, in the sheath 18, the total number of plates being therefore 50, the number of plates in the series 15. The plates yellow, the median 0·35 mm. broad, the length of the basal part of the four outer lateral plates 0·06-0·10-0·14-0·20 mm., and mounting up to 0·30, that of the first (inmost) 0·28 mm. The median plates (fig. 10) with three denticles at the base of the finely denticulated hook; the lateral plates (fig. 10) with finely denticulated hook, with one denticle at the inside of its root, with 2-3 on its outside; the 3(-4) outer lateral plates (fig. 11) without hook.

The masticatory stomach small, 4 mm. long with a diameter of 4; it showed about five clear yellowish white pyramids of a height of about 2·5 mm.; close at the cardiac end 2-3 series of small roundish tubercles. The liver yellow.

The penis (fig. 12) 9 mm. long, no armature.

This form seems to represent a definite species.

5. APL. EUSIPHONATA, B. n. sp.

Pl. III., figs. 5-15.

Of this form one specimen was procured in May, 1902, at East London.

It had a length of 8.5 cm. by a height of 5 and a breadth of 4.5; the height of the rhinophores and tentacles was 5 mm., the length of the foot-wings was 6.5, their height (on the inside) 2 cm.; the length of the mantle 3.3 cm., the breadth 2.4; the height of the large siphon 2.2 cm., its breadth at the base 2.6, at the upper end 1.2 cm.; the breadth of the foot 2 cm.—The ground colour of the upper side, whitish, the head and the neck blackish, due to black partly confluent stripes; the outside and inside of the foot-wings with spread rather large irregular black spots; the mantle clear grayish with a few black spots and some black stripes radiating from the centre; the foot clear dirty yellowish.

The form as usual. The foot-wings large, reaching to the root of the very short tail, their margin very slightly undulated, the outside and the inside quite smooth. The mantle of oval circuit, the anterior end a little more pointed, on the centre of the somewhat convex upper side there may be a fine opening; the siphon (figs. 5, 6) very large, embracing a great part of the upper side, fixed to the hinder wall; the anus was seen in the upper part of the siphonal channel; the large mantle quite covered the gill with exception of its pointed end (fig. 6). In the mantle *no trace of a shell could be found*. The somewhat brownish gill strongly curved, the chorda measured 14 mm., its height 11, its thickness 6 mm., on the underside a broad furrow between the lamellæ; its last fourth freely projecting.

The central nervous system as in other true Aplysiæ; the pleural ganglia not half as large as the pedal, lying next to these and before them.

The length of the mouth tube 5 mm. The *bulbus pharyngeus* 10 mm. long by a height and a breadth of 8. The hooks of the gray palate as usual, somewhat grayish, as much as 0.20 mm. high (fig. 8). The mandibular plates strong, brown, broader in the upper end, 4 mm. high by a breadth of 2.5 and a thickness of 0.25 mm.; their high elements (fig. 7) of a diameter of 0.009 mm. The tongue with brown rasp, containing 28 rows of plates, in the sheath 18, the total number of rows being thus 46; the number of lateral plates on each side of the median about 26. The plates were yellow, only the outer nearly colourless; the breadth of the median 0.25 mm.; the length of the body of the first lateral 0.25, the length

rising to 0.30 mm., the body of the four outer measuring 0.10–0.14–0.18–0.29 mm. in length. The median plates (fig. 9) somewhat plump, their legs rather short, their hook strong, and denticulated along the margins; the lateral plates (figs. 10–12) of the usual form, the strong hook with 4–5 denticles at the root of the outer margin, the point with fine denticles, mostly somewhat stronger on one margin; the 4 outer smaller (fig. 13), two without any trace of a hook, and the next with a short one without denticles.

The grayish œsophagus 6 mm. long. The yellowish first stomach somewhat curved, 17 mm. long by a diameter of 10. The *masticatory stomach* 6 mm. long by a diameter of 10.5; it showed arranged in usual way 10 larger plates and in front 8 smaller; the plates of usual form, pyramidal, of reddish brown colour, of a height up to 4 mm. The *posterior stomach* 8 mm. long by diameter of 7; in its cardiac part fine folds, on the pyloric margin a series of yellow conical and pyramidal plates, 1–1.5 mm. high, always with broken or worn point (fig. 14).—The gray contents of the stomachs formed of different algæ, undeterminable detritus and very small sand-particles. The intestine as usual.

The dirty dark-gray *liver* nearly globular, 2.4 cm. long by a breadth of 2.2 and a height of 2 cm.

The yellowish white *hermaphrodite gland* about 14 mm. broad by height of 12 and a thickness of 4; its duct running with its short windings along the whole of the under-side of the *anterior genital mass*. This last, the albumino-mucous gland, 8 mm. long by a height of 5 and a breadth of 4, yellowish white with the usual spiral white band. The sperm-oviduct a little curved, 8 mm. long by diameter of 2, quite as usual; the short pyriform spermatheca 3 mm. long, the spermatocysta half as large. The yellowish *præputium* (fig. 15a) 8 mm. long, the retracted glans bent, 4 mm. long, more whitish, with transparent furrow, with strong retractor muscle. The inside of the præputium grayish, in front black, nowhere in the penis any trace of armature.

6. APL. POIKILIA, B. n. sp.

Pl. II., figs. 20–21; Pl. III., figs. 1–4.

A single specimen was found at Kalk Bay (in Simon's Bay); it had coloured the preserving fluid brownish.

It was 7 cm. long by a breadth of 3 and a height also of 3 cm.; the length of the tentacles and of the rhinophoria 8 mm.; the length of the foot-wings 4 cm., by a height on the inside of 1.3; the length of the mantle 3 cm. by a breadth of 2.2; the foot was 1 cm. broad.—The ground colour of the upper side was grayish white, but for the

most part disappearing through large confluent or anastomosing irregular black spots; the mantle with strong spots and stripes radiating from about the centre; similar markings occurred on the upper part of the inside of the foot-lobes reaching to their margin, the rest being grayish white, as were also the side parts of the body adjoining the mantle; the foot grayish white.

The form of the usual type, the foot-lobes free as far as their hinder end; the mantle without hole; the siphonal mantle-fold rather flat, 6 mm. long by a breadth of 2.2; the gill as in the former species.

The shell 22 mm. long by a breadth of 20 and a height up to 4 mm. (fig. 1); the cuticular margin rather broad, else the shell was yellow, rather solid, with a prominent nucleal part.

The grayish *bulbus pharyngeus* short, pear-formed, 10 mm. long by a breadth and height of 9. The mahogany brown mandibles strong, 5 mm. high by a breadth of 3; their elements (with a diameter of 0.007 to 0.30 mm.) high, thin, their upper point bent (fig. 20). The palatal hooks nearly colourless, weak and thin, reaching to a height of 0.24 m., by a diameter at the base of 0.035 (fig. 21). The strong *tongue* contained in the yellow rasp 32 series of plates, in the sheath 22, the total number of the series being thus 54. The 6 foremost series were very incomplete and the plates mostly damaged; the 6 hindermost in the sheath not quite developed. The number of lateral plates on each side of the median was 25. The plates were yellow, the breadth of the median (between the legs) 0.28 mm., the length of the first lateral 0.26. The median plates (fig. 2) of usual form with serrulated hook, and on either side of it two denticles. The inner lateral plates (fig. 3) were also of the common form, with serrate hook and two denticles at its base (fig. 4).

The oesophagus was developed posteriorly into a proventricle. The *masticatory stomach* nearly cylindrical, 9 mm. long, with the usual armature, the plates faint yellowish. The grayish-brown *liver* 28 mm. long by a height and breadth of 17.

The *hermaphrodite gland* yellowish white, 15 mm. broad by a length of 10 and a thickness of 4–5 mm. The *anterior genital mass* yellowish white, 15 mm. long by height of 7 and a thickness of 4 mm.; the yellowish-white spermatheca globular, of a diameter of 9 mm., the pear-formed spermatocysta 2.5 mm. long. The grayish *penis* somewhat bent, 15 mm. long; the more whitish glans conical, 4 mm. long (without armature).

The colour of the animal, its mandibles, and perhaps the nature of the palatal hooks seem to indicate a definite species.

7. APL. WOODII, B. n. sp.

Pl. II., figs. 13-19.

Together with a specimen of *Doridium capense*, one individual of this *Aplysia* was procured on the shore, East London (23.5.1902).*

The furrow of the rhinophores and tentacles was velvet-black, otherwise the animal was whitish with scattered traces of gray. Its length was 3 cm. by a breadth of 1.7 and a height of 1.6; the length of oval mantle 12 mm., the length of its oval hole 5, the length of the siphon 5, the gill 14 mm. long by a breadth of 4; the length of the foot-wings 18 mm. by a height (on the inside) of 7.

The end of the sole of the foot was developed in a strange way, perhaps pathologically. It formed, as it were, a roundish disc (fig. 13) of a diameter of 9 mm., a little elevated and limited to the rest of the foot on the sides and in front. The wings of the foot passed one into the other behind; the strong siphon broadly gaping; the large pallial gland with cells of uncommon size.

The rather flattened *shell* (fig. 14), of a length of 13 by a breadth of 8 mm., very thin, cuticular with very slight and spread traces of calcination, with a small uncalcified nucleus, somewhat pointed in front.

The central nervous system quite as in other true *Aplysiæ*.

The mouth tube on the outside and the inside dark gray. The *bulbus pharyngeus* 7 mm. long by a breadth of 4 and a height of 3.5. The mandibles dirty yellow, 3 mm. high by a breadth of 2; their elements (fig. 15) reaching a height of 0.25 by a diameter of 0.013. The rasp of the *tongue* yellow, perhaps containing 19 and the sheath 18 rows of plates, on each side of the median plates probably about 30 lateral. The plates yellow; the breadth of the median 0.24 mm.; the length of the basal plate of the first lateral 0.20, of the second 0.023; the length of the four outermost 0.05-0.08-0.08-0.13 mm. The median plates (fig. 16) broad, with short and broad hook, which is serrated as far as the pointed end; the three outermost lateral plates (fig. 19) small, without hook; the other plates are similar in form, have a very pointed hook with a strong denticle on each side; the innermost (fig. 17) had moreover some finer denticles on the outer margin of the hook, which were absent on the rest (figs. 18, 19).

The white salivary glands quite as usual.

The pharynx gray. The oesophagus whitish, 10 mm. long by a diameter of 4. The first stomach 4 mm. long and broad, at the pylorus

* It is named after Mr. John Wood, East London, who has rendered valuable service in the discovery of this and other marine animals new to science.

two series of (about 10) short cones. The *masticatory stomach* 4 mm. long by a diameter of 5; its armature as usual, but the pyramids were nearly all gone; these were of the usual form, clear yellowish, transparent. The third stomach 5 mm. long by a breadth of 3·5; at its cardiac end distinct round impressions left by cones, which were absent.

The grayish brown liver irregularly globular, its greatest diameter being 10 mm.; the gall-bladder whitish.

The white hermaphrodite gland 4 mm. broad by a height of 3 and a thickness of 2, somewhat meniscus formed; in its lobules ripe genital elements (zoosperms). The penis whitish, grayish in front. The conical white glans 1·5 mm. long.

This form seems allied to the *Apl. Sibogæ* (*l.c.*, 1905, p. 9, taf. vi., figs. 36-42; taf. vii., figs. 1-6).

8. *APL. MONOCHROA*, B. n. sp.

Pl. I., figs. 22-24; Pl. II., figs. 2-7.

Three specimens were procured at Hermanus on January 15, 1897. Two individuals were dissected.

They were of about the same size, and otherwise resembled each other, were uniformly white, except that the inside of the rhinophores and tentacles was blackish brown.

The largest one was 4·5 cm. long by a breadth of 2 and a height of 2·5; the foot-wings reaching to the head, 2·5 c.m. long by a height (on the inside) of 1; the length of the oval mantle-hole 7·5 mm. (fig. 22), the white foot 10 mm. broad.

The form was as usual; the whole of the back quite even. The *shell* rather variable in form, thin, in one specimen quite cuticular, in another merely in the two posterior thirds slightly calcified, 18 mm. long by a breadth of 16, rather depressed (fig. 2). Near the hinder end of the mantle-hole, a little to the right, the mantle sends out a sort of siphonal (expiratory) fold separated from the free mantle margin protecting the gill (fig. 22). The curved whitish *gill* 13 mm. long by a height up to 8 and a breadth to 4·5 mm., the rhachis rather strong, on each side about 18 tufts of lamellæ; the gill projecting freely by about a third. The foot rather narrow, somewhat broader in front.

The mouth tube 4 mm. long. The whitish *bulbus pharyngeus* 6·5-7 mm. long by a breadth and a height of 6; the yellowish mandible-plates not broad, their thin elements of a height up to 0·12 mm. by a diameter of 0·007 (fig. 23). The palate in the middle with the usual network with glands; the palatal plates weak, with

thin, colourless hooks (fig. 24) up to the height of 0·08 mm. by diameter of 0·007–0·016.

The rasp of the strong *tongue* yellow, with 18–19 series of plates, in the sheath 17–18, the total number of series thus being 35–37. In the series 17–18 lateral plates on each side of the median. The plates yellow, the median 0·28 mm. broad; the length of the four outermost 0·6–0·14–0·16–0·20. The median plates (fig. 4) of the usual form, with finely denticulated hook and 2–3 denticles at its base. The lateral plates of the usual form (figs. 5–7), the three outermost without any trace of hook, the next with a rudiment, the following of the usual form, but the hook without denticles, which begin on the sixth to eighth (figs. 6–7).

The *oesophagus* in its posterior half developed into a *proventriculus*. The *masticatory stomach* nearly cylindrical, stiff, 3 mm. long by diameter of 4; in both individuals eight larger pyramids, bright yellowish up to 2 mm. high, and four smaller, more irregular, mostly bluntly conical.

The *liver* yellowish white, on section yellow, 2 cm. long by a height of 1·5 and a breadth of 1·3–1·5; a small whitish gall-bladder was very distinct.

A branchio-renal pore was very distinct deep under the root of the gill. The sub-branchial gland well developed.

The hermaphrodite gland white. The proper albumino-mucous mass 9–10 mm. long by a height of 7–9 and a thickness of 4; the sperm-oviduct 10 mm. long; the globular spermatheca of a diameter of 5 mm. The penis long, whitish, at its hinder end a small, apparently glandular, appendix (fig. 3a). (No armature, neither of the small whitish glans nor of the *præputium*.)

The form here examined seems to represent a new species.

II. DOLABELLA, Lam.

Lamarck, *Syst. des Anim. s. Vert.*, 1801, p. 62.

Cuvier, *Mém. sur la Dolabella &c.*, *Ann. du Mus.* v., 1804, p. 435.

Rang, *Hist. Nat. des Aplysiens*, 1828, pp. 45–49, pl. i.–iii., xxiv., fig. 1.

Bergh, *Die Opisthobranchiaten der Siboga Expedition*, 1905, pp. 13–20.

Corpus postice latius oblique truncatum; parapodiis brevioribus, apertura branchiali breviori angustiori. Testa pro majore parte nuda, fortior, nonnihil securiformis, margine sinistro crassiori, postice angustior, dextrorsum emarginata et parte nucleali deorsum incurvata carina postica prominenti instructa.

Systema nervosum ut in *Aplysiis* propriis. Radula (linguæ) dentibus medianis elongatis, dentibus lateralibus numerosis non denticulatis.—Glandula hermaphrodisiaca hepatis non connata.

This animal, with its peculiar form, was first noticed by Rumph (D'Amboin. Rariteitkamer, 2 ed., 1741, N. x., N. 5), who figured the animal as well as its shell, but without any description. On the figure of the shell, given by Rumph, Lamarck established the genus *Dolabella*, which was adopted by Cuvier and afterwards by malacologists.

The form of the animal is quite peculiar, differing from that of all other *Aplysiidæ*; it is posteriorly broader, and terminates in a roundish oblique large disk, to the middle of which the rather narrow, longish branchial slit is continued. The somewhat dolabri-form shell well calcified, with thickened left margin; the hinder part narrower, its right margin is notched; the hind end thicker, bent downwards and to the right, with a sharp, prominent keel.

The central nervous system as in the *Aplysiæ* proper.

The rasp (of the tongue) has longish median plate and long series of undenticulated lateral plates.

The hermaphrodite gland not coalescent with the liver.

The genus seems confined to the Red Sea, the Indian and Pacific Oceans.

As the form called by Cuvier *Dolabella Rumphii* cannot now be determined, this name must be reserved for the form figured by Rang. This author has, moreover, drawn up a small series of species (*D. Hasseltii*, *Teremidi*, *ecaudata** (*truncata*), and still others have been named by Ehrenberg, Quoy and Gaimard, Sowerby, Stearns (*D. Hemprichii*, *tongana*, *elongata*, *californica*†); some of them are merely established on the shell, which is rather variable in form, and some are very likely merely varieties of a very widely distributed species.

DOL. RUMPHII, (Cuv.) Rang, var.

(*D. Rumphii*, Cuv., *l.c.*, p. 437, pl. xxix., fig. 1.)

D. Rumphii, Rang, *l.c.*, p. 46, pl. 1.

Aplysia tongana, Q. et G., *Voy. de l'Astrolabe*, ii., 1832, p. 305, pl. 23, figs. 6-7.

* V. d. Decken, "Reisen in Ostafrika," iii., 1869; v. Martens, "Mollusken," p. 65: *Dolabella ecauda*, Rang (Zanzibar).

† Tryon and Pilsbry, "Man. of Conchology," xvi., 1895-96, pp. 151-160.

Dolabella Hasseltii, Fér. Eliot, Notes on Tectibr. and Naked Moll. from Samoa. Proc. Ac. Philadelphia, 1899, p. 515, pl. xix., fig. 3.

(*Dolabella callosa*, Lam. Syst. des Anim., s. v. 1801, p. 62.)

Dolabella Rumphii, Cuv., Rang. Bgh., l.c., 1905, pp. 13-20; taf. vii., figs. 22-40; taf. viii., figs. 1-7 (9).

Pl. XIV., figs. 10-20.

One specimen was procured at East London and preserved in formalin.

The length of the individual was 12 cm. by a breadth of 9 and a height up to 6.3; the length of the posterior disk was 7.5 cm. by a breadth of 8.5 (the breadth of its brim 1.2); the length of the branchial slit 7 cm. by a breadth at both ends of 1; the height of the siphon 9 mm., that of the parapodia 13, of the (contracted) rhinophoria 6 mm.; the length of the curved gill in a straight line 3.5 cm. by a breadth of 2.3 and a thickness of 1.8 cm. The animal was one-coloured, yellowish white, the gill less bright.

The *shell* of typical form (figs. 12, 13), 4.3 cm. long by a breadth of 3.3; the crest on the hinder end not strong; the calcareous layer on the under side of the strong yellowish cuticula broken in pieces in front, the upper as well as the under side of the shell chalk-white.

The form of the animal was typical, the branchial fissure reaching to about the middle of the hinder disk. The back with rather numerous (fig. 11) small pointed cones of a height of 2-4 mm., as also the hinder disk, as well as its somewhat lacinated brim (fig. 10). The seminal furrow in its first part running in the depth between the parapodia for a length of 2 cm., then continued forwards to the male genital opening under the right tentacle. The mouth, the siphon, the anus, and the pallial gland as usual. Nearly the posterior half of the gill projects freely; on either side it showed about ten strong compound chief lamellæ; at the base of the frenulum of the gill the reno-branchial aperture. The common genital opening as usual.

The *central nervous system* agrees with that of the true Aplysiæ, and is quite different from that of the Notarchidæ, with which group the Dolabellæ otherwise show affinities; the visceral ganglia thus situated far backwards (on the side of the spermatheca). The nearly coalescent cerebral ganglia measure in breadth nearly 4 mm.; the cerebro-pleuro-pedal connectives about 13 mm. long; the pleuro-pedal ganglionic mass 8 mm. broad; the pleural ganglia scarcely half as large as the pedal.*

* Cf. Amaudrut, Bull. Soc. Philom., x., 1886, pp. 68-74.

The very retracted and contracted mouth tube about 7 mm. long. The plump *bulbus pharyngeus* 15 mm. long and high by a breadth of 12, of usual form, with the end of the rasp-sheath somewhat prominent on the lower side posteriorly; the strong inferior retractor muscles of the bulbus issuing from the region of the margin of the hinder disk of the body. The strong, somewhat brittle *mandible plates* of a length of 7 mm. by a breadth of 3·8 and a thickness of 0·4 mm.; they were yellowish brown on the free side, on the breach yellowish white; their closely set angularly cylindrical elements of a diameter of 0·016 mm. (fig. 19). On each side of the *palate* a thin, dirty yellowish plate, 3 mm. broad, densely set with (fig. 18) horny, compressed hooks, of form as in other Aplysiidæ, of a length up to 0·8 mm. by a breadth to 0·10. This spinous covering continued a little behind the roof of the pharynx. The large *tongue* with deep cleft; the rasp brownish yellow, containing 42 series of plates (counted at the margin of the rasp), in the sheath 44, of which the 5 hindermost are not fully developed; the total number of series about 86; the 6 foremost on the tongue very incomplete and partly damaged. The number of plates in the series seemed to be about 200. The plates were yellow; the length of the median was about 0·20 by a breadth up to 0·07 mm.; the height of the two outermost lateral plates was about 0·14–0·16 mm.; through the series the height of these plates rose to 0·37 mm. The median plates in form very different from those of the proper Aplysiæ, longish, narrower in front, with a small denticulated hook at the anterior end (figs. 14, 15); the lateral plates of ordinary hook form (figs. 16–17).

The yellowish white *salivary glands* long, reaching to the cardia, nearly cylindrical, of a diameter of 2 mm., thinner behind; the efferent duct quite short.

The length of the gray œsophagus with its dilatation (proventriculus) 4 cm. by a diameter of 7–12 mm., its interior with fine longitudinal folds and plump villi. The (masticatory) *stomach* brownish gray, somewhat roundish, of a (transverse) diameter of 2·5 cm. by a length and height of 1·7; the usual nerves run along this stomach, anastomosing at the pylorus and forming a circle around this, and then continued on the second stomach. The anterior part of this stomach had 8 somewhat depressed angular-roundish facets belonging to the stomach plates, and behind them 2–3 series of smaller and less regularly set facets. The 8 large very hard stomach plates were irregularly pyramidal; the broad basis convex, very smooth; the height and the breadth nearly the same, 7–9 mm.; the base and the top brown; otherwise the base was chalk-white.

Behind these plates 10 somewhat smaller followed, mostly rather compressed, more irregular, yellow, of a height of 4–6 mm. Behind this stomach, in the mouth of the second, more thin-walled gray stomach, were seen about 5 series of rounded small papillæ, each with a pointed, straight, yellow prickle of the height of 2–2·5 mm. (fig. 20); papillæ of the same kind, mostly without horn, were scantily distributed over the stomach. The abundant content of the stomachs was fine paunce mixed up with vegetable substance (different algæ), parts of small worms, and some foraminifera and small Rissoa-like shells. The dirty gray *intestine* makes a large superficial curve in a furrow of the liver and ascends to the anus; its diameter 7–9 mm., its wall thin, its abundant contents the same as in the stomachs.

The large *liver* dirty and dark greenish gray, 5 cm. long by a breadth of 4 and a height of 3·8, superficially 3-lobed by the windings of the intestine; its mass compact, with a small cavity. In front, immediately behind the second stomach, opens the bent, horn-shaped *gall-bladder*, contrasting by its milk-white colour with the liver, of a diameter of 4 mm., with about its half freely projecting on the under side of the liver.

The bright yellowish white *kidney* 3·3 cm. long by a breadth of 2·3 cm. and a thickness of 5–6 mm.

The yellow-white *hermaphrodite gland* at the hinder end of the liver convex-plain, 4·5 cm. long by a breadth of 2·5, and a thickness of 2; in its lobules ripe genital elements. The thick hermaphrodite duct in corkscrew windings running to the anterior genital mass; its diameter mostly 3·5 mm., anteriorly much thinner. The *anterior genital mass* large, 3·5 cm. long by a height of 3 and a thickness of 1·5; chiefly formed by the large muco-albuminous gland. On the right side of this appeared a black central region of oval form, 11 mm. long, encircled by alternately more whitish and more yellowish arcuate windings; the left side more simple with a large winding. The curved *sperm-oviduct* extended 5 cm. long by diameter of 8–4 mm.; on the cuts two tubes, separated by an incomplete septum, appear. The *spermatheca*, situated immediately before the pericardium, globular, of a diameter of 15 mm. The dark grayish *penis* (præputium) folded up extended 5 cm. long by diameter of 7–4 mm.; to its posterior end, which is yellowish, the strong retractor is attached, to its anterior end the digitations of the protractor. The inside with fine longitudinal folds and a thicker one, all with a number of black points. From the bottom of the cavity projects the flattened, blackish only at the point, else yellowish, somewhat strained *glans*, extended 15 mm. long by a

breadth of 5; one margin is thick, compact, otherwise it is flat, leaflike.

The colour of this specimen was different from those I also have seen*; the form of the shell, too, somewhat particular, and the stomach-plates different. Still, it is very likely but a variety of the somewhat variable *Dol. Rumphii* (Cuv., Rang).

NOTARCHIDÆ.

R. Bergh, *Die Opisthobranchiata der Siboga Expedition*, 1905, pp. 20-27.

This group contains the genera *Notarchus* (Cuv.), *Aclesia* (Rang), *Aplysiella* (P. Fischer), and *Phyllaplysia* (P. Fischer).

ACLESIA, Rang.

Rang, *Hist. Nat. des Aplysiens*, 1828, p. 68, pl. xx.-xxii.

R. Bergh, *Malacolog. Untersuch.* V. 1900, pp. 352-361.—The Danish Expedition to Siam, 1902, pp. 168-174.—*Die Opisthobranchiata der Siboga Expedition*, 1905, pp. 20-23.

Notæum sicut rhinophoria et tentacula papillis majoribus simplicibus et compositis instructum; fissura branchialis brevis. Scutum palliale sicut testa desunt; branchia, ren et pericardium in cavitate branchiali libera (scuto non tecta). Podarium non angustum.

Ganglia visceralia antice, inter pleuralia sita. Penis conulis hamigeris armatus.

The genus was established by Rang, and the plates xx.-xxii. have the name of *Aclesia*; in the text he has (p. 68) retracted the name, referring the species named in the plates to the genus *Notarchus* of Cuvier, to which, however, they do not belong. The genus has mostly been adopted by malacologists and conchologists† for forms like those originally given by Rang, but a real knowledge of the genus dates from the later years (1900, 1902, 1905).

The *Aclesiæ* belong to the warmer seas, and especially to

* R. Bergh, "*Die Opisthobranchiata der Siboga Expedition*," 1905, pp. 13-20, taf. vii., figs. 22-40; taf. viii., figs. 1-9; taf. lx., figs. 1-3.

† The genus *Thallepus* of Swainson ("*A Treatise of Malacology*," 1840, pp. 250, 359) is often mentioned as being synonymous with *Aclesia*. The characters given by Swainson are partly incorrect and quite insufficient; the characteristic tufts on the back of the *Aclesiæ* are not at all mentioned.

those of the tropics. Somewhat better known are the following species :

1. *Acl. Pleii*, Rang.
M. atlant. occid.
2. *Acl. striata* (Q. et G.).
M. africano-indic.
3. *Acl. cirrhifera* (Q. et G.).
M. africano-indic.
4. *Acl. impexa*, B.
M. phillipin.
5. *Acl. ocelligera*, B.
M. Siamense.
6. *Acl. varicolor*, B.
M. indicum.
7. *Acl. pusilla*, B.
M. indicum.

ACL. CIRRHIFERA, Q. et G.

Aplysia cirrhifera, Q. et G. Voy. de l'*Astrolabe*, ii., 1832, p. 311, pl. 24, fig. 8.

Aclesia cirrhifera, Q. et G. Ed. v. Martens, Beitr. Meeresfauna d. Insel Mauritius u. d. Seychellen., 1880, p. 308.

Aclesia cirrhifera, (Q. et G.) Bgh., l.c., 1900, pp. 351-360, taf. xxix., figs. 28-31.

Pl. III., figs. 16-24 ; Pl. IV., figs. 1-7.

Two individuals were procured from the lagoon at Port Alfred, five specimens caught at low-tide at Knysna along shore from jetty towards village, one was procured at the mouth of Nahoon on June 12, 1900, one more at East London in August, 1902.

They were all of a very similar exterior ; but the colour of the smaller was dark greenish gray, that of the larger blackish gray, with small black dots ; the foot always yellowish gray. The largest individuals were 8 cm. long, by a height and a breadth of 4 ; the height of the rhinophores and tentacles about 7 mm. ; the length of the gill-slit 1-2 cm. ; the breadth of the foot 3 cm. ; the length of the tail 1.5-2 cm. The other individuals 5-7 cm. long.

The four specimens anatomically examined had a length of 4.6-7 cm. by a breadth of 2.6-4 and a height of 2.5-3 ; the height of the rhinophores and the tentacles 4-5 mm., of the papillæ of the back -5 mm. ; the length of the gill-slit 6-10 mm. ; the breadth of the foot 1.5-2.7 cm., the length of the tail 1-1.3 cm.—The animals were very soft in consistence.

The form of the animal as in other *Aclesiæ*, a little pointed behind, the back rather vaulted. The backside everywhere very uneven, covered with simple and compound papillæ, for very large part confluent to numerous undulating crests and tufts covered with smaller papillæ; on the sides of the back proper the crests sometimes coalesced in a kind of ridge and behind on each side over the tail in a larger prominent knot. The rhinophores and the tentacles also covered with papillæ. The border of the foot-wings convex, their inside even. The seminal furrow distinct. The foot a little broader in front, with a small median notch.

On the floor of the *gill-cavity* no mantle plate, and the organs were uncovered (Pl. III., fig. 16). On the left side the long white kidney with a pore on its hinder end (fig. 16). To the right of the kidney the strong curved gill, of dirty yellowish colour, with grayish or blackish rhachides (fig. 16). Stretched out, it had a length of about 2 cm. by a breadth and height of 4–5 mm., about its half not attached; it contained about 15–18 groups of lamellæ (fig. 1). Behind the first part of the gill the thick upwards turned anal papilla with black striæ and several (about eight) rather prominent knots around the opening (fig. 16c). Before the gill to the left the somewhat black dotted pericardium and to its left, under the brown part, the blood-gland; the vulva as usual.

The central nervous system as usual in the Notarchidæ.

The mouth tube 3–4 mm. long. The *bulbus pharyngeus* short-pyriform with the thick radula-sheath projecting a little on the lower side behind; 7·5–9 mm. long by a breadth of 5–6·5 and a height of 4·5–6, whitish. The mandibles longish, broader upwards, 2·5–3 mm. long by a breadth up to 0·75–1, dark red-brown (fig. 17); their elements nearly cylindrical, reaching to a height of 0·2 by diameter of 0·020 mm. (fig. 18). The walls of the cavity of the mouth dark red-yellow, darker on the palate, whose side parts showed the usual covering of closely set compressed hooks of a height up to 0·1 mm. (fig. 19); this covering is continued to some extent up into the pharynx. The rasp of the short and broad *tongue* (fig. 20) dark brown or brownish yellow, of a length and a breadth of 3–4 mm., containing 20–28 series of teeth, in the sheath 15–18, the total number of series thus being 35–46. The number of lateral plates on each side of the median about 36–40. The plates reddish brown at the basal parts, elsewhere yellow, the breadth between the legs of the median plates nearly 0·20; the lateral reached a height of 0·30 mm.; that of the four outermost was mostly about 0·12–0·16–0·20–0·24. The median plates of the usual form (fig. 21), with 3–4 denticles on each side of the pointed hook; the first lateral

plate (fig. 21) with bilobate hook and some small denticles on the margin of the outer lobe; on the following plates (figs. 3, 4) the outer lobe had become a coarse denticle; on the following one, two, or mostly three, rather blunt denticles on the hook (figs. 5, 6); sometimes the denticles failed on some plates, or four were seen (fig. 6); on the 3-5 outermost plates denticles were not seen (fig. 7).

The long white salivary glands, 12-14 mm. in length by a breadth of 0.5 mm., as usual, and reaching backwards to the masticatory stomach.

The œsophagus 8-10 mm. long, its hinder part sometimes dilated into a first stomach of a length of 4 by a breadth of 6 mm. The *masticatory stomach* 5-9 mm. long by a diameter of 9-10; it showed, arranged in the usual way, 8-10 larger pyramids, in the cardiac part moreover 6-4 smaller and more irregular, 8-7 more conical; or 10 larger and 8 smaller, in all 22-21-18 stomachal teeth. The larger were up to 4 mm. high and their base also to 4 mm. broad; they were brownish yellow, cartilaginous, translucent, and showed the common finely iridescent axial or subaxial column. The *third stomach* 8-12 long. The intestine as usual.—The *liver* dirty brownish yellow, 2.3-3 cm. long by a breadth of 1.5-1.6, reaches a height of 1.4-1.5; it was short-sausage shaped, by the windings of the intestine superficially divided in several longer or shorter lobes united with each other. Anteriorly beside the intestine a little biliary cavity was found, with several openings in the pyloric part of the third stomach; no proper biliary bladder was seen.

The pericardium was large. The ventricle of the heart 5 mm. long, the crista of the truncus aortæ pellucid, 2 mm. long.

The whitish small *hermaphrodite gland* 6-7 mm. broad by a length of 5-3 and a thickness of 2; in its lobes ripe genital elements; its duct in coils wound between the lobes of the liver to the inside of the *anterior genital mass* (fig. 2a). This latter whitish and yellowish white, in length measuring 10-15 mm. to the vulva by a height of 5-6 and a thickness of 2-3 mm. The proper (fig. 2b) muco-albuminous gland convex-plain, on its upper margin the pellucid pear-formed *spermatocysta* of a length of 3 mm. (fig. 2c), opening with its duct in the root of the sperm-oviduct. The gland is continued in a nearly cylindric tube, a little longer than the gland itself, the *sperm-oviduct* (fig. 2d), on sections it is seen divided into two parts of unequal size by a strong fold or partition-wall; in the lower part the *spermatotheca* seems to open. This latter (fig. 2e) lies before the heart, on the hinder end of the stomach; it was globular, yellowish, of a diameter of 4 mm.; its duct a little longer

than the bladder itself, opening near the vulva (fig. 2f).—The *penis* 7–10 mm. long by diameter of 1·5–2, nearly cylindrical, a little tapering anteriorly (fig. 22); its anterior half blackish, the rest yellowish; the inside is also dotted with black and shows fine longitudinal folds, between which one stronger than the others and continued up to and on to the small, 2 mm. long, whitish conical glans. This last and the top of the *præputium* show small cones partly set in longitudinal series (fig. 23); most of the cones carry a horny thorn, a little curved and of a height up to 0·28 mm. (fig. 24).

The form here examined probably represents a variety of the typical *Acl. cirrhifera*.

CEPHALASPIDEA.

PHILINIDÆ.

PHILINE, Ascanius.

Philine, Ascanius. Vetensk. Ak. Handl., 1772, p. 329.

Lobaria, O. Fr. Muller. Zool. Dan. Prodr., 1776, pp. xxix., 226.

—Zool. Dan., iii., 1788, pp. 30–31, tab. C, figs. 1–5.

Bullæa, Lam. Systém des An., s. v. 1801, p. 63.

Philine, Asc. Bergh, Malacol. Unters. v. 1900, p. 275.—Die Opisthobranchiata der Siboga Exped., 1905, pp. 28–32.

Animal sat applanatum (testa non recondendum); clypeus frontalis magnus, subquadratus, postice non lobatus, oculis externe conspicuis nullis; sub margine laterali clypei antice rhinophoria parva plicata; osphradium parvum simplex ante fissuram branchialem situm. Pallium testam omnino includens, postice paullum supra et infra prominens; glandula spiralis nulla. Podarium breve, latum, epipodiis sat crassis lateribus interstitium inter pallium et clypeum implentibus.

Testa interna tenuis, fragilis, pellucida, alba, sat applanata; spira minuta depressa; apertura amplissima, postice angustior; columella angusta callo levi.

Mandibulæ nullæ. Radula rhachide nuda, pleuræ dente laterali fortissimo uncinato et interdum dentibus externis (1–6) hamatis.—Glandulas salivales parvæ sacciformes. Ventriculus masticatorius (fere semper) laminis calcareis fortissimis subsimilibus oblongis tribus armatus, utrinque laterali et inferiore singula.

Penis inermis, apparatu prostatico fortissimo præditus.

These animals are of very peculiar form; their thin shell quite

inclosed in the mantle. They have no mandibles. The rhachis of the tongue is naked; the pleuræ wear a very strong, particularly formed lateral plate and sometimes also (1-6) outer plates. They have a particular masticatory stomach with three very strong calcified plates. Their unarmed, peculiarly formed penis is provided with a well-developed prostatic apparatus.

1. PHILINE APERTA (L.).

Bulla aperta, L., Syst. Nat., ed. xii., 1767, p. 1183; ed. xiii. (Gmelin), t. i., pars vi., 1791, p. 3424.

Philine quadripartita, Asc. l.c., 1772, p. 329, tab. x., figs. a, b.

Bulla Schroeteri, Phil. En. moll. Sic., ii., 1844, p. 94, tab. xx., fig. 2.

Bulla Schroeteri, Ph. Krauss, Die südafrikan. Moll., 1878, p. 70.

Philine quadripartita, (Asc.) R. Bergh. Malac. Unters. v. 1900, pp. 276-285, taf. xxiii., figs. 15-35; taf. xxiv., figs. 2-5; taf. xxvi., figs. 1-9.

Pl. V., figs. 5-10.

More than twenty large specimens were procured by dredge off Elsie Peak (False Bay) from a depth of 10 fms. on sand and shell bottom; several also near Roman Rock (False Bay) by shrimp-trawl on fine sand from a depth of 13-18 fms., and in False Bay, and off Cape Natal and Umvoti River.

The first-mentioned had a length of 5.5-6 cm. by a breadth of 3.5-3.3 and 4, and a height of 1-1.5 and 2 cm.; the length of the piece behind the foot was 1.8-2 cm. The animals were coloured white.

The *shell* was 2.8 cm. long by a breadth of 2.5, and a height of 1.5 cm.; white, rather solid.

The form of the animal quite as usual. The tentacular (frontal) shield and the mantle shield nearly of the same length. The flat rounded-hexagonal *tentacular shield* with its slightly prominent margin mostly covering the neck, and sometimes also the anterior margin of the mantle shield. The anterior margin a little notched in the middle, and on each side of it a fine pore; next to the furrow between the shield and the foot the yellowish, slightly prominent *rhinophore* about 1 cm. long, with about fifteen low folds. The *mantle shield* somewhat convex, rather posteriorly and somewhat to the left sometimes (in the two larger individuals and three smaller), a fine opening leading to the shell. The hinder margin of the mantle prominent beyond the shell, notched medianly, and passing in the rather flat and broad covering of the left part of the shell and

of its free margin. This under part of the mantle is separated from the foot by a rather deep furrow, and towards the right side cleft by the open longitudinal branchial fissure; behind the hinder end of the fissure a fine glandular opening. The *branchial cavity*, in accordance with the form of the shell, rather low; the curved, brownish *gill* about 10–12 mm. long by a height of 4–6 and a breadth of 3–5. Over the gill the small, sometimes black punctuated, *osphradium*; above the root of the gill the prominent *anus*. Below the fore end of the gill the *vulva*, whose opening is continued in the seminal groove that runs along the low side of the body to the male aperture near the mouth. The broad *foot* a little narrower before, with a little median notch or slit, on each side of which there is a fine opening; the sides of the foot through their whole length developed into a strong wing, on the sides filling the space between the two shields, thicker below, rising to a thin convex margin; the posterior margin free, covering the groove before the under side of the mantle, oblique from the right side to the left and forwards, straight or convex in the middle, with posteriorly prominent edges belonging to the wings of the foot.

The length of the whitish mouth tube 6–7 mm., its inside yellowish. The whitish *bulbus pharyngeus* of the usual form, 5–6 mm. long. The strong tongue, with deep cleft, with yellowish or brownish yellow rasp, containing 15–20 series of plates, in the sheath 12–16, of which the two hindermost are not fully developed; the total number of series being thus 27–36. The rhachis not narrow. The plates nearly colourless in their upper half; their length (in straight line) 1 mm.; their form was quite as formerly described (*l.c.*, p. 279); still, the denticulation was finer than in the specimens from the Atlantic and Mediterranean Sea, and did not seem to extend so far out on the hook as in these specimens (figs. 6–8).

The *salivary glands* small but somewhat longer than usual, 4–6 mm. long, whitish, applanated (fig. 5).

The *oesophagus* short, 3 mm. long. The first *stomach* 6 mm. long by a diameter of 6–7, its hinder end sunk in the cardia of the second stomach. This *masticatory stomach* sometimes turned a little to the right, usually lying on the under plate, 2 cm. long by a breadth of 1·3 and a height of 1·2. The two lateral masticatory plates 20 mm. long by a breadth of 7·5–8 and a thickness of 2–3; the inferior of a length of 16 by a breadth of 9 and a thickness of 3 mm.; their outside yellowish or chalk-white; the inside showed the large flat central part white; this part was inclosed by a broad belt of fine yellow lines, the marginal part white; the two small holes on the

outside and inside less pronounced than in the specimens from other localities, and even on the inside scarcely visible; still, one or two of the three plates showed in two individuals three holes. The *third stomach* 10–11 mm. long by a diameter of 4–5, with very thin walls with fine folds. The *intestine* as usual, about 10 cm. long by a diameter of 2–4 mm.—The contents of the stomachs (sometimes, too, of the *bulbus pharyngeus*) chiefly very fine sand-particles, thin pieces of algæ, fragments of small bivalves, some *Polythamia*.

The *liver* dirty brown, 2–2·5 cm. long by a breadth of 1·2–1·4 and a height of 1 cm.

The white *kidney* 13 mm. long by a breadth of 3–4.

The yellow *hermaphrodite gland* covering the hinder end and a small part of the upper side of the liver with a layer about 4 mm. thick; the ampulla of its duct forming a coil of white windings. The *anterior genital mass* seemed to be essentially quite as before (*l.c.*, p. 283) described, 12–14 mm. long. The grayish brown spermatheca globular, of a diameter of 6 mm.; the strong yellowish duct 8 mm. long; the spermatocyst whitish, sack-formed, 2 mm. long. The seminal furrow terminating in the male aperture near the right side of the mouth. Into it also opens the *penis*, which is pear-formed, 4·5–5 mm. long; on the base of the organ is fixed a strong retractor, and into its cavity opens the large prostata, a small globular gland, and a small cylindrical sack of the length of 2 mm. (fig. 9c). The large coil of the *prostata*, 8–11 mm. long by a breadth of 8–9, lying under and behind the *bulbus pharyngeus*; when disentangled the length of the organ was about 20–25 cm.; the tube was yellowish, its last windings white. The small, mostly globular, glandular sack (fig. 9e) yellowish, 2–2·5 mm. long, its duct mostly 2–3 times as long; the sack was always intimately fixed to one of the windings of the prostata (fig. 9a). From the base of (fig. 9d) the penis sack (præputium) projects the glans, nearly as long as the sack, mostly very pronounced hammer-shaped (fig. 9e), along the stalk a distinctly visible furrow, issuing from the opening of the (fig. 10a) prostata and continued especially along one of the legs of the hammer; in one of the individuals the end of the hammer projected from the genital opening (fig. 9).

In spite of some differences, this form seems to belong to the typical *Ph. aperta*. According to Hanley* the original specimen of Linnæus was from the Cape, and there seems to be every reason for returning to the old specific name.

* Hanley, *ipsa Linnæi conchylia*, 1855, pp. 203–204.

2. PHILINE CAPENSIS, Bgh. n. sp.

Pl. V., figs. 11-15.

Off Cape Point Lighthouse, SW. by W. $4\frac{1}{2}$ miles, one specimen was taken by shrimp-trawl from a depth of 29 fms. on bottom of fine sand.

It was of whitish-yellow colour. Its length was 11 by a breadth of 7 and a height of 6 mm.; the frontal shield very inclined forwards, 6 mm. long; the mantle shield 9 mm. long by a breadth of 5; the wings of the foot 2.5 high.

The thin mantle quite enveloping the shell except (by mutilation of?) the middle. The *shell* as long and large as the mantle, chalk-white, not thin, but rather fragile, of usual (fig. 11) form.

The *bulbus pharyngeus* 1 mm. long, with prominent rasp-sheath, the lip disk with strong cuticula. In the yellow rasp of the *tongue* 8 series of rows, in the sheath 14, the total number of rows being therefore 22; the radula formula was 2-1-0-1-2. The nearly colourless lateral plates (fig. 12) of about the usual form, (in direct line) measuring in length 0.30; the first external plate rather thin, about 0.20 mm. long (fig. 13); the other, the outermost, shorter and a little thicker, 0.14 mm. high (fig. 14).

The whitish salivary glands long, strong, very nodular.

The *masticatory stomach* 3.5 mm. long by a diameter of 3; of its plates, the median a little smaller than the others, which measured 2.5 mm. in length by a breadth of 1 (fig. 15); they were greenish yellow, rather thin and flexible; no holes could be detected either on the outer or on the inner side.

The large liver, sausage-formed, 7 mm. long, 4 broad, gray on the outside, its substance brown-gray.

The penis and the very large bundle of coils of the prostata seemed to agree with the arrangement in the typical species.

This form belongs to the group of *Philine*, which has outer as well as lateral plates—one (*Ph. scabra*, M.; *Ph. catena*, Mtg.; *Ph. Lovéni*, Malm; *Ph. sinuata*, Stimps), or two (*Ph. quadrata*, Wood; *Ph. lima*, Brown; *Ph. velutinoides*, Sars), or several (6) (*Ph. pruinosa*, Clark).*

* Cf. Sars, Moll. reg. arcticæ Norvegiæ, 1878, pp. 293-303, tab. 18, xii.

DORIDIIDÆ.

- R. Bergh, Die Gruppe der Doridiiden. Mittheil. aus der zool. Station zu Neapel, xi., 1893, pp. 107-135, taf. 8.—Die Opisthobranchien. Report on—*Albatross*, xiii., 1894, pp. 205-222, taf. x.-xii.—Malacol. Unters. v. 1901, pp. 177-181, 303-307, taf. xxv.
- Eliot, On Doridiidæ. Proc. Malacolog. Soc., v., 1903, pp. 331-337, pl. xiii.
- R. Bergh, Die Opisthobranchiata der Siboga Expedition, 1905, pp. 42-46.

This group of rather pregnant exterior contains two not very different genera.

I. DORIDIUM, Meckel.

R. Bergh, *l.c.*, 1893, p. 109.—1894, p. 209.

1. *Dorid. tricoloratum* (Renier).
M. Mediterr.
2. *D. depictum* (Renier).
M. mediterr.?
3. *D. punctilucens*, B.
M. Antillense.
4. *D. purpureum*, B.
M. pacific.
5. *D. cylindricum* (Cheeseman).
M. pacific.
6. *D. ocelligerum*, B.
M. pacific.
7. *D. diomedium*, B.
M. pacific.
8. *D. lineolatum*, (H. & A. Adams) B.*
M. pacific.
9. *D. cyaneum*, v. Martens.
M. africano-indic.
10. *D. pilsbryi*, Eliot.
M. pacific.
11. *D. capense*, B.
M. pacific.

* R. Bergh, Gaster. opisthobranchiata, 1902. The Dan. Exped. to Siam, pp. 17-18, pl. ii., fig. 12.

12. *D. obscurum*, B.
M. pacific.
13. *D. albo-ventrale*, B.
M. pacific.
14. *D. Gardineri*, Eliot.
M. pacific.
15. *D. reticulatum*, Eliot.
M. africano-indic.

II. CHELIDONURA, A. Adams.

Chelidonura, Ad. R. Bergh, Die Opisthobranchier (Schauinsland, Ergebn. einer Reise). Zool. Jahrb., xiii., 1900, pp. 212–220.

—R. Bergh, *l.c.*, 1905, pp. 42–46.

? *Navarchus*, Cooper. R. Bergh, *l.c.* (*Albatross*), 1894, pp. 213–222.

1. *Chelid. hirundinina* (Q. & G.), var. *elegans*, B.
 ,, ,, (Q. & G.), var. *punctata*, Eliot.
 M. pacific et africano-indic.
2. *Ch. inermis* (Cooper).
 M. pacific. (Calif.).
3. *Ch. ænigmatica* (B.).
 M. pacific. (Panama).
4. *Ch. plebeia*, B.
 M. pacific.
5. *Ch. varians*, Eliot.
 M. africano-indic.
6. *Ch. velutina*, B. (Siboga-Exped., 1905).
 M. indic.
7. *Ch. philinopsis*, Eliot.
 M. africano-indic.
8. *Ch. amæna*, B. (1905).
 M. indic.

DORIDIUM CAPENSE, B. n. sp.

One individual was captured on the shore at East London (23.5.02). Preserved in formalin it still had the largest part of a 2.5 cm. long Annelide hanging out of the retracted mouth.

It measured to the end of the hinder wings 5 cm. in length by a breadth (with raised foot-lobes) of 1.8 and a height of 1.9; the length of the anterior shield was 2.2 cm., its hinder end projected freely 6 mm.; the wings of the hinder shield 10 mm. long; the proper foot 13 mm. broad, its wings 8 mm. high, the tail 8 mm. long. The animal was nearly uniformly coloured grayish white (but had

certainly been darker when alive); the under side of the free part of the anterior shield, the neck under it and the sides of the body blackish, the margins of the foot-lobes on the hinder wings blackish on their inside (fainter on their outside); the large gill white; the foot grayish, black at its anterior end.

The form as usual; the fore shield rather long; the wing-like lobes of the hinder shield projecting downwards with the point turned somewhat inwards; the right wing seemed somewhat larger than the left; no flagellum. The whole of the upper side of the animal quite smooth. The large gill projects nearly quite free from the gill cavity; it is 8 mm. broad by a height of 6 mm., composed of 10 large tufts of lamellæ, its end a little rolled up.

The *shell* quite membranous with a faint touch of yellowish, only the indistinct rolled up small nuclear part a little calcified; the large winding did not seem to project towards the root of the right wing; the length of the shell 13 by a breadth of 7 mm.

The mouth tube 6 mm. long, black on the outside as well as on the inside. The *bulbus pharyngeus* 14 mm. long by a height of 9 and a breadth of 8 mm., yellowish white on the outside and the inside, of the usual rounded prismatic form and of the usual structure; the walls of the arrow-formed cavity of a thickness of 2.5–3 mm.

The liver yellowish gray.

The penis yellowish, black in front.

This form is perhaps specifically different from the other hitherto described.

NOTASPIDEA.

PLEUROBRANCHIDÆ.

R. Bergh, *Malacolog. Unders.* v. 1897–98, pp. 1–158, 371–380, taf. i.–xii.

PLEUROBRANCHÆA, Leue.

R. Bergh, *System, l.c.*, p. 4 (–51).—*l.c.*, II., 1905, pp. 47–49.

1. PLEUROBRANCHÆA CAPENSIS, Vayss.

Vayssièrè, *Monogr. de la Fam. des Pleurobranchidés*, 2 partie. *Ann. des sc. nat.*, 8 S., t. xii., 1901, pp. 46–49, pl. iv. figs. 232–237.

Pl. IV., figs. 8–11.

A notice of the locality, where 19 individuals of this form had

been caught, is wanting; at Cape Point Lighthouse by shrimp-trawl on fine sand-bottom from a depth of 33 fms. 8 more were taken.

They were very similar in size and colour, and were in a very contracted condition in the formalin in which they were preserved; 4 individuals were dissected.

The length of the largest was 2·3–3·5 cm. by a breadth of 2–2·3 and a height of 1·5–2; the gill 10–16 mm. long by a breadth of 4–6; the foot 15–16 mm. broad. The colour whitish or grayish whitish, the back with a faint olive-gray network of lines and patches partly bordering, partly covering the not very pronounced nodules. In nearly all individuals the black œsophagus was very distinctly visible through the surrounding tissues.

The back covered all over with weak nodules. The rather flattened gill with about 15–17 tufts of lamellæ on each side of the rhachis. The præbranchial papilla very distinct, somewhat cleft. A tail-gland not externally visible and a finger on the end of the tail always absent.

The mouth tube 4 mm. long, its inside blackish gray. The *bulbus pharyngeus* whitish, together with the prominent rasp-sheath 7·5–8–10 mm. long by a breadth of 5–6 and a height of 4–4·5 mm. The mandibular plates rather hard, grayish yellow; their elements (figs. 8, 9) as usual high, a little curved, columns of a height up to 0·29 mm. by a diameter of 0·04. The palate, which was longitudinally and transversely wrinkled, was black, as were also the cheeks. The rasp of the *tongue* brownish yellow, containing 26–30–34 rows of plates, in the sheath 18–20–25, the total number of series being thus 44–50–59. The number of plates in the rows seemed to amount to 95. The plates pale yellow in the basal part, otherwise colourless; the height of the outermost about 0·08 mm., that of the largest 0·4. On the narrow rhachis a fine longitudinal fold, sometimes broken in pieces, but no trace of false plates. The plates (figs. 10, 11) essentially as in the *Pl. Meckelii*, the outermost 4–8 without denticle.

The ampulla of the duct of the glandula salivalis white or blackish, but the continuation of the duct towards the mouth black. The gl. ptyalina well developed, its tubes often covering the back of the *bulbus pharyngeus*.

The œsophagus black, on the inside velvet-black, 4·5–5 mm. long, in the hinder part of a diameter of 3. The liver 12–16 mm. long by a height and a breadth of 9–10, dirty-yellowish, or grayish, on sections brownish.

The *anterior genital mass* yellowish white, 8–10 mm. long by a height of 4·5–7 and a breadth of 4–7; the prostata short-reniform, its greatest diameter being 5 mm.; the vas deferens as in the species

described by Vayssi re, much shorter than in the typical species (cf. *l.c.*, p. 49, fig. 232).

Perhaps the form here examined is really the *Pl. capensis* of Vayssi re.

PLEUROBRANCH A CAPENSIS, Vayssi re, var.

Pl. XI., figs. 1-8.

One specimen was found off Cape Hangklip; in its mouth an annelide, 11 mm. long, was sticking. The state of preservation was not good.

It was uniformly coloured whitish. Its length about 18 mm. by a breadth of 10 and a height of 6; the breadth of the frontal veil (with the 3 mm. long tentacles) 10 mm.; the height of the rhinophoria 2.5; the gill 5 mm. long by a breadth of 3; the penis projected 2.5, the pr branchial papilla 0.8 mm.; the breadth of the foot 10 mm., the tail 3 mm. long.

The form as usual. On the margin of the frontal veil very slight traces of papill e; the back quite even. On the somewhat prominent genital papilla were situated the rather projecting penis in front and the female opening behind; between the genital papilla and the gill the prominent pr branchial papilla. The gill with about 20 leaves on each side, its hindmost part (2 mm. long) free; at the base of this part the anal papilla; under the middle of the gill the fine renal aperture. The tail without finger-like papilla; its gland not pronounced, about 2 mm. long.

The intestines were not visible through the walls of the body.

The central nervous system as in other Pleurobranch e. The large eye of a diameter of 0.28 mm.

The mouth tube 2 mm. long, wide. The *bulbus pharyngeus* whitish, but its inside and the palate black; the length 6 by a breadth of 4.5, and a height of 3 mm.; the rasp-sheath 1.5 mm. projecting. The mandibular plates longish, 3 mm. long, clear yellow; their elements as in other Pleurobranch e, of a height up to 0.20 mm. by diameter of 0.045; they were mostly hexagonal, the free facet in the anterior margin finely denticulated, the number of the denticles commonly 8-10 (figs. 1-2). The broad *tongue* with very pale yellowish radula with about 25 series of plates, in the sheath 20, the number of series being thus 45; the number of plates on each side amounted to 50. The plates (figs. 3-6) colourless, of the usual form, the length of the largest 0.30, their height 0.20 mm.; the length of the outermost (fig. 6) 0.10 mm., the denticle of these last sometimes very short.

The proper *glandula salivalis* white, transversely ovate, 1.5 mm.

broad, the two long efferent ducts in their last, about 2 mm. long, portion gray, as were also their pear-formed ampulla. The gl. ptyalina and its duct as in the typical species.

The *oesophagus* violet-black. The *liver* grayish yellow, 9 mm. long by a breadth of 7.

The præbranchial sack (fig. 7) rather bent, extended nearly 6 mm. in length.

The *hermaphrodite gland* whitish, about 5 mm. broad by a thickness of 2. The *anterior genital mass* whitish, 5 mm. long by a height and breadth of 3; the prostata of a diameter of 2.5 mm.; the coils of the continuation of the vas deferens extended 3 cm. in length, much longer than represented by Vayssière (*l.c.*, p. 49; pl. 4, fig. 232cd), but absolutely different from the relations of the organ in *Pl. Meckelii**; the internal sheath of the vas deferens projecting (fig. 8) 1.2 mm. (0.05 mm. broad) from the end of the penis.

The forms here examined differ from the typical one by the absence of the caudal finger and the very different relations of the vas deferens. It may be that it is really the *Pl. capensis* of Vayssière; the individuals which have been examined by Vayssière as well as by me, have been too insufficient to settle the question with certainty.

2. PLEUROBRANCHÆA MELANOPUS, B. n. sp.

Pl. IV., figs. 12-15.

Off Cape Point (NE. by E. 36 miles) one individual was caught by shrimp-trawl from a depth of 650 fms.; the bottom was green mud.

The length was 2.4 by a breadth of 1.5, and a height of 1.3 cm.; the height of the rhinophores 4, of the tentacles 3 mm.; the length of the gill 5 mm. by a breadth of 2.5; the breadth of the foot 8 mm., the length of the caudal gland 3 mm. by a breadth of 1.—The animal very likely had been velvet-black all over, but on the back this colour only remained on the head and partly towards the margin; elsewhere it seemed rubbed off; the dirty yellowish colour of the gill, with traces of black on the rhachides, of the cleft præbranchial organ, and of the outer genitals as well as of the caudal gland, contrasted with the black of their surroundings.

The anterior margin of the tentacular veil with 2-3 series of small nodules. The back quite even. The gill somewhat flattened, with

* Cf. my Monogr. of the Pleurobranchidæ (*l.c.*, v. 1897, p. 25-26; taf. iii., fig. 22; taf. iv., figs. 3b, 4c, 5b.

about 20 lamellæ on each side of the smooth rhachis. No caudal finger.

The inside of the mouth tube black. The whitish *bulbus pharyngeus* 7 mm. long by a breadth of 6 and a height of 5; the pharynx black, as also were the walls of the mouth-cavity. The mandibles under the black coating wax-white; their somewhat compressed elements of the usual form (figs. 12, 13) 0·20 mm. high, their upper facet of a length of 0·06. The rasp of the *tongue*, dirty-brown, seemed to contain about 22 rows of plates, in the sheath 17, the total number of rows being thus 39; in the series on each side of the narrow rhachis very likely about 60 plates. The basal part of the plates reddish brown, their height reaching to about 0·4 mm., that of the two outermost 0·14 and 0·16; their form (figs. 14, 15) the usual, the outermost mostly without the denticle.

The whitish, roundish, flattened gl. salivalis of 5 mm. diameter; the gl. ptyalina very developed.

The brownish gray liver 13 mm. long by a height of 7. The large whitish kidney 12 mm. long by a height of 7 and a thickness of 2, with many transverse furrows.

The yellowish *hermaphrodite gland* lying on the hinder end of the liver and the kidney, and continued along the upper margin of the latter; in the male and female lobules ripe genital elements. The anterior genital mass somewhat compressed, 10 mm. long, and, as far as could be determined, as in the typical species.

OSCANIOPSIS, Bgh.

R. Bergh, Die Pleurobranchiden, 1, 1897, p. 53. (Malacolog. Unters. V., p. 53 (-61).)

Vayssière, Monogr. de la Fam. des Pleurobranchidés, ii. Ann. des sc. nat. Zool., 8 S., xii., 1901, pp. 6-15.

R. Bergh, Die Opisthobranchiata der Siboga Exped., 1905, pp. 49-52.

Caput discretum nullum. Notaeum a velo (scuto) frontali (tentaculari) latissimo non discretum, applanatum, læve, testa nulla; tentacula sicut rhinophoria distantia, lateralia, canaliculata. Rhachis branchiæ serie nodulorum duplici instructa. Apertura genitalis simplex. Podarium magnum, infra massa glandulari caudali mediana præditum.

Connectiva cerebro- et pleuro-pedalia brevia sed distincta.—Mandibulæ ex elementis applanatis compositæ.

This group represents a passage from the Pleurobranchææ to the

Oscanii. The back is, as in the former, continued directly into the large semilunar tentacular shield; the tentacles as well as the rhinophores are thus very distant; no shell in the flat and even back. Oscaniopsis has the short form of Oscanius, and the rhachis of the branchia shows as in the last a double series of nodules. They have, moreover, a simple genital aperture, and the large foot shows on the under side of the tail a peculiar gland. The central nervous system and the elements of the mandibular plates are as in the Oscanius. Sometimes the glans penis is covered with small cones.

On the form of the tentacular shield in the *Pleurobranchus luniceps* H. and A. Adams (in 1858) established the genus *Neda*; this was adopted by Gray (Guide, 1, 1857, p. 203) as well as (still with some doubt) by P. Fischer (Man. de Conchyl., 1887, p. 573). The genus *Oscaniopsis* was formed and scientifically established much later. There is hardly any real reason for returning to the loosely sketched denomination *Neda*.

The genus has contained hitherto merely some few forms from the Chinese and Indian Sea (*Osc. Semperi*, B.; *O. compta*, B.; *O. Amboinei*, Vayss.*), which perhaps are not even specifically different, but identical with *O. luniceps* (Cuv.), which has been known for a long time.

OSCANIOPSIS PLEUROBRANCHÆANA, B.

Pl. IV., figs. 16-21.

One specimen was obtained off south head of Tugela River by shrimp-trawl from a muddy bottom at a depth of 12-14 fms.

It had a length of the body of 3.5 cm. by a breadth of 1.8 and a height of 1.2; the breadth of the tentacular shield was 2.2 cm., the height of the rhinophores 6 mm.; the breadth of the brim of the back was, on the right side and over the tail, 8 mm.; on the left side the brim was narrower; the gill 15 mm. long by a breadth and height of 5; the length of the foot 3.5 cm. by a breadth at the anterior end of 1.5, the length of the tail 1.2 cm.—The animal was coloured white; through the foot and the side the intestines appeared brownish gray.

The large semilunar tentacle shield gives the animal a very peculiar appearance. This shield is, in the middle of the margin, rather broadly notched; it ends in tentacles in the usual way; the

* Vayssi re, "Monogr. de la Fam. der Pleurobranchid s," 1, 1898, pl. 15, fig. 27 (*Pleurobranch a maculata*, Q. et G.); ii., 1. l.c., 1901, pp. 15-20, i. pl. 1, figs. 190-204.

margin with about 20 small prominences, of which 3-4 on each side have a knotted appearance (fig. 16). The shield as well as the whole of the back are otherwise rather flat, quite even. The distance between the base of the rhinophores 1 cm.; the brim of the back rather projecting over the tail, rounded behind. The præbranchial papilla strong, not cleft; before it the prominent vulva. The gill rather pointed behind, its half freely projecting, the number of lamellæ about 40, the vesicles at their base small; the renal and the anal pore as usual. The foot rounded in front with a fine marginal furrow, its brim rather broad (5 mm.); the tail rather long, on the outside scarcely any trace of a gland visible.

Half of the *bulbus pharyngeus* projected freely in front. The bulbus of a length of 14 by a breadth of 10 and a height of 9.5 mm. of the usual form. The mandibular plates whitish, thin and very brittle; their elements reaching a length of 0.06 mm. by a height of 0.025, of the usual form, the denticulation very slight (fig. 17) or wanting. The palate of the mouth-cavity black. The *tongue* with yellow rasp, which seemed to contain about 40 series of plates; the number of the series in the sheath could not be determined on account of the hardened and brittle state of the whole of the tongue and especially of the sheath. The number of plates in the series could not be determined, but exceeded 100. The lower part of the plates brownish yellow, the rest nearly colourless; their height was up to 0.63 (measured from the anterior end to the point), the length of the innermost 0.58, of the three outermost 0.10-0.16-0.25 mm. The plates were different from those of other known Oscaniopsis, nearly quite as in the Pleurobranchæa, provided with a long pointed denticle (figs. 18, 19), only the 4 outermost had no such denticle (fig. 20).

The central nervous system as usual; the cells reaching a diameter of 0.2 mm. The eyes of a diameter of 0.30 mm., with large yellow lens.

The white salivary glands (gl. salivales) roundish (fig. 21), button-like, with deep hilus, one touching the other in the midline; together they measured 4.5 mm. in diameter, the white ducts with the usual ampulla at some distance from their end. The supplementary salivary gland (gl. ptyalina) very developed, its duct whitish.

The black œsophagus 6 mm. long by a diameter of 2-4; the inside also black, with fine longitudinal folds.

The grayish stomach 7 mm. long by a diameter of 4. The intestine as usual. The contents of the stomach and of the intestine were indeterminable animal matter.

The *liver* brown, 10 mm. long by a breadth of 4 and a height of 6;

on the right side partly covered by the kidney, on the upper side and on the posterior end partly by the hermaphrodite gland, in front by the gland. salivales.

The kidney whitish gray, 7 mm. long by a breadth of 6.

The *hermaphrodite gland* white, 9 mm. long by a breadth of 3 and a thickness of 1.4; in the predominant male follicles bundles of zoosperms, in the female less developed eggs. The white somewhat globular *anterior genital mass* of a maximum diameter of 2.25 mm. The hermaphrodite duct long, thin, forming many windings; on the mass in front the sperm duct makes a clew of windings; the prostata somewhat applanated, roundish; the præputium of the penis thin; no cones were detected on the glans.

This is certainly specifically different from the typical form, and constitutes a connecting link between *Oscaniopsis* and *Pleurobranchæa*.

OSCANIELLA, Bgh.

R. Bergh, *Die Pleurobranchiden*, l.c., v., 3, 1898, p. 94 (-115).—*Die Opisthobranchiaten der Siboga Expedition*, 1905, pp. 58-66.

The *Oscaniellæ* are intermediate between the genera *Oscanius* and *Pleurobranchus*.

They belong to the warmer regions of the seas, especially to the Indian and Pacific Ocean.

OSCANIELLA NIGROPUNCTATA, Bgh. n. sp.

Pl. IV., figs. 22-26; Pl. XI., figs. 9-18.

One specimen was procured off Cape Infanta by tow-net. It was rather contracted and bent together.

In its present state the *length* is only 22 mm. by a breadth of 16 and a height of 12. Examined more closely the breadth of the brim of the back was 6-8 mm.; the length of the rhinophores 5, of the tentacles 3 mm.; the length of the gill 8 mm. by a breadth in front of 4; the breadth of the foot 14 mm., of its brim 5; the length of the tail 9 and of its gland about 4 mm.—The general colour of the animal was yellowish; the back covered all over with somewhat darker scarcely prominent, sometimes nearly confluent, roundish or polygonal areas of a diameter up to 3.5 mm.; on the anterior and posterior ends of the back, as well as towards its sides and especially on the brim, the areas show a very pronounced black centre (fig. 9). On the under side of the brim the dark areas shone distinctly through. Black spots were scattered over the brim of the foot as well as on the tail. The intestines shone through the skin nowhere.

Quite in front a small, perfectly transparent, colourless *shell*, 2.5 mm. long, and without any trace of calcification, was seen (fig. 10).

The form was as usual; the tentacles small; the back smooth with brim broad; the gill with two very pronounced series of nodules (vesicles); in front of the gill a small præbranchial tube. The genital apertures without protecting folds. The foot well developed, the tail projecting behind the body proper.

The central nervous system quite as in other *Oscaniellæ*. The ganglion opticum distinct with a short N. opticus, the diam. of the large eyes 0.30 mm.; in the skin of the back, as is usual in the *Oscaniellæ*, there were peculiar filaments (fig. 11) of different length and bent in the most different way, often serpentine; their diameter 0.0035–0.005.

The length of the buccal tube 3 mm.; that of the *bulbus pharyngeus* 4.5 mm. by a breadth of 5 and a height of 3.5; of the usual form, the rasp-sheath a little projecting behind. The yellowish mandibles quite as usual, as also their rather clumsy elements (figs. 12–14), whose length rose to 0.22 by a breadth of 0.14 and a height of 0.08 mm.; on each side of the somewhat pointed hook 2–4 short denticles. The *tongue* as usual; in the yellowish rasp about 25 series of plates, in the sheath 20, the total number of rows being thus 45; in the series up to about 120 plates. The plates (figs. 15–18) were yellowish; the height of the innermost 0.035 mm., rising to 0.12, further on up to 0.18, then decreasing, the tenth from the outer margin of the rasp measuring 0.08, the outermost 0.035 mm. The plates of the inner half of the series hook-formed (figs. 15, 16), those of the outer erect with shorter base (figs. 17, 18); the teeth had no trace of denticles.

The stomachs as in other *Oscaniellæ*. The liver yellowish brown.

This form seems different from the other hitherto known species.

OSCANIELLA NIGROPUNCTATA, B. var. ?

Pl. IV., figs. 22–26.

Off Cape St. Blaize (N. 42, E. 11 miles) a single individual was taken by shrimp-trawl.

It was very badly preserved, the colour mostly rubbed off and replaced by a dirty gray. The back all over had been covered by rather closely placed small polyangular scarcely prominent disks of a diameter of 2–3 mm., now grayish brown with a whitish centre (sometimes like a papula); somewhat smaller disks of the same kind

were scattered over the head and the upper side of the brim of the foot; the upper lip of the marginal furrow of the anterior end of the foot brownish.—The length was 3 cm. by a breadth (of the back) of 2 and a height of 1·3; the frontal veil 14 mm. broad, the breadth of the mantle-brim 5; the length of the gill 16 mm. by a breadth of 5 and a height of 4; the breadth of the foot 22 mm., that of the brim 4.

The form as usual. The number of the lamellæ in the gill about 25, the vesicles along the rhachis very distinct; the external genital organs nearly without prominent folds; the caudal gland, very indistinct, seemed 7 mm. long.

The nature of the shell could not be determined.

The nervous system as usual. The skin contained a quantity of cells and groups of not calcified cells.

The mouth tube 3 mm. long. The *bulbus pharyngeus* (with the prominent rasp-sheath) 9 mm. long by a breadth of 7 and a height of 4. The mandibles clear reddish yellow, 7 mm. long by a height of 3·5, in a length of 2·5 mm. denudated. Their elements brownish yellow, 0·26 mm. long by a breadth of 0·14 and a height of 0·1; behind the pointed hook on each side 4 denticles, of which the upper the largest (fig. 22). The rasp of the *tongue* of a clear yellow colour, the number of series of plates was large, and so too the number in the rows. The plates with yellowish basal part, otherwise nearly colourless; the height of the 4 innermost (fig. 23) 0·035–0·04–0·06– and 0·08 mm., quickly mounting to 0·20, then gradually to 0·25, then decreasing; the height of the three outermost (fig. 26) was 0·035–0·06–0·10 mm. The inner half of the series, or thereabout, had the hook of the plates somewhat crooked (fig. 24); in the remainder it was straighter (fig. 25).

The gland. *ptyalina* not much developed. The liver brownish gray, contrasting in colour to the yellowish white hermaphrodite gland.

This form is distinctly different from the *Oscaniella granulata* described by me (*l.c.*, pp. 113–115, tab. ix., figs. 17–22) as being the *Pleurobranchus granulatus* of Krauss, which seems to be a *Berthella*.

It is possible that it represents a variety of *Osc. nigropunctata*.

BERTHELLA, Blv.

Berthella, Blainville. Man. de Malacol., 1825, pp. 469, 627, pl. xliii., fig. 1.

Cleanthus, Leach. Moll. Brit. syn., 1852, p. 28.

Berthella, Blv. R. Bergh, Die Opisthobr. d. Siboga Exp., 1905, pp. 68–73.

BERTHELLA GRANULATA (Krauss)?

Pleurobranchus granulatus, Krauss. *Die Südafric. Moll.*, 1848, p. 61.

? *Berthella granulata*, Vayss. *l.c.*, 1898, pp. 268–271, pl. 15, figs. 14–16.

Pl. IV., figs. 27, 28; Pl. V., figs. 1–4.

Two specimens were procured, October 23, 1897, at Somerset West (False Bay). They were very much hardened.

They were similar in appearance, were 2·5–3 cm. long. The largest was 1·2 mm. broad, 1·4 mm. high; the breadth of the frontal veil was 10 mm., the length of the flattened gill 13 mm. by a breadth of 5, the breadth of the foot 15 mm. The animals were of one colour, yellowish gray.

The form about the same as that of *B. plumula*; on the mantle, which was quite smooth, a very fine white punctuation. The genital capilla without stronger folds. The shell was not visible externally.

The *shell* placed anteriorly and a little to the right, 6·5 mm. long, by a breadth in front of 3, very flattened, hard, yellow, with an anterior cuticular brim, the spire very small (fig. 27), white.

The *bulbus pharyngeus* whitish, of usual form, 7 mm. long by a breadth of 4 and a height of 3 mm. The mandibular plates yellow, thin; their elements (fig. 28, 1, 2) of a length of 0·16 and a height of 0·08; the hook is very pointed, without denticles (sometimes the point was split in 2 to 3 short needles), the lateral knots only slightly prominent, the inferior margin forming an angle. The yellow rasp of the *tongue* contained about 40 series of plates, in the sheath were about 43, the total number of rows therefore being 83; about 130 plates in the rows. The plates yellow at the base, otherwise nearly colourless, reaching a height of 0·25 mm., their form and relations (figs. 3, 4) being otherwise nearly as in the *B. plumula*.

Another specimen was procured at Kalk Bay, January 5, 1904. It had a length of 24 mm., the fine gill 11 mm. long; no trace of white punctuation of the mantle.—The *shell* 5 mm. long by a breadth of 2, rather hard, reddish yellow, the small spire white.

The *bulbus pharyngeus* 5 mm. long by a breadth of 4 and a height of 3; the mandibles (as well as the rasp) brownish yellow. In the rasp of the tongue about 38, in the sheath about 33 series of plates. The plates as usual.—The penis as usual.

Vayssi re seems to have examined the original specimens of

Krauss, and with respect to the shell, the elements of the mandibles and to the lingual plates, the form here examined agrees with the figures given by Vayssière. On the other hand the "*Pleurobranchus* (*Oscaniella*) *granulatus*, Krauss," in my Monograph,* founded on a specimen purchased as belonging to the form of Krauss, is quite different, and does not even belong to the *Berthellæ*.

BERTHELLA GRANULATA (Krauss), var.

A specimen was procured from Hout Bay by dredge, December 22, 1897, resembling the above.

It had a length of 3 cm. by a breadth of 2 and a height of 1·5; the breadth of the frontal veil was 11 mm., the length of the somewhat flattened gill 18 by a breadth of 4, and the breadth of the foot 16 mm. The animal was of a uniform grayish colour, no white punctuation being visible on the back.

The gill with about 25 pairs of lamellæ.

The mouth tube 3 mm. long. The *bulbus pharyngeus* 5 mm. long by a breadth of 2·5 and a height of 3·5; the elements of the yellow mandibles merely 0·14 mm. long by a breadth of 0·05 and a height of 0·05; otherwise quite as in the form above. The plates of the tongue as above, reaching a height up to 0·28 mm.

Four smaller (15–17 mm. long) individuals were procured at Gordon's Bay (in False Bay) at low tide. Their mandibles and rasp were quite similar to those of the other individuals, only that their elements were much smaller.

NUDIBRANCHIATA.

NUDIBRANCHIATA HOLOHEPATICA.

DORIDIDÆ CRYPTOBRANCHIATÆ.

ARCHIDORIDIDÆ.

R. Bergh, System der nudibr. Gasteropoden. Malacolog. Untersuch., iii. (xviii. Heft). 1892, pp. 1092–1094.

ARCHIDORIS, Bgh.

R. Bergh, *l.c.*, p. 1092;—*l.c.*, 1905, p. 93.

* *L.c.*, pp. 112–115, taf. ix., figs. 17–22.

ARCHIDORIS CAPENSIS, Bgh. n. sp.

One specimen, now very much hardened, was procured at Cape Point by large trawl ; it had been first treated with cocaine.

The specimen was of a uniform white colour. Its length was 40 mm. by a breadth of 22 and a height of 12 mm. ; the height of the rhinophores was 3, the diameter of the gill-aperture 5, the height of the gill-leaves 5 mm., the breadth of the brim of the back 7 ; the tentacles 2 mm. long ; the breadth of the foot 11, of its brim 3 mm., the length of the tail 5.

The form oval, somewhat depressed. The back even, quite finely chagreened, with broad brim. The somewhat clumsy club of the rhinophores with numerous lamellæ, stiffened by closely set long very hardened spicules. The number of gill-leaves 6. The tentacles finger-shaped. The foot strong, the anterior margin with deep furrow, the upper lip with median cleft.

The cerebro-pleural ganglia somewhat long, the pedal short, pear-shaped. The eyes of a diameter of 0.22 mm., with large yellow lens ; the otocysts measuring 0.16 mm. in diameter packed full with otokonias. The skin full of very hard long spicules of a diameter up to 0.025 mm., mostly lying in bundles sometimes irregular and star-shaped. In the interstitial connective tissue a mass of similar spicula.

The mouth tube 5 mm. long. The somewhat yellowish *bulbus pharyngeus* (inclosing the strong 3 mm. projecting rasp-sheath) 9 mm. long by a height of 5.5 and a breadth of 6 mm. ; the lip disc covered by a colourless and not thin cuticula. The broad *tongue* with yellow rasp, the rhachis narrow, the number of rows about 28, in the sheath 33, the total number being thus 61 ; about 90 plates in the series on each side ; the plates of the common hook form ; the height of the outermost 0.14 mm., of the sixth 0.20, the height rising to 0.25 mm.

The salivary glands long, well developed, of a diameter up to 2 mm., reaching backwards to the liver, the ducts very short.

The stomach globular, 5 mm. in diameter, projecting from the cleft of the liver ; the intestine 24 mm. long by a diameter of 1.5. The *liver* on the outside yellowish, its substance yellow, of conical form, its fore-end obliquely truncate, 17 mm. long by a breadth anteriorly of 10.

The oval pericardium 10 mm. ; the pericardio-renal organ somewhat flattened, 1.5 mm. long.

The thin layer of the whitish *hermaphrodite gland* contained in its lobules ripe genital elements. The anterior genital mass of irregular

meniscus-form, 14 mm. long by a height of 11 and a breadth of 5, yellowish white and white; the spermatheca pear-shaped, 5 mm. long, the spermatocysta globular, of 3 mm. diameter; the efferent ducts without any trace of armature.

This form seems to belong to the genus *Archidoris*.

2. *ARCHIDORIS GRANOSA*, B. n. sp.

Pl. V., figs. 16-18.

At Tongaati River mouth (NW. by N. $\frac{1}{4}$, N. $5\frac{1}{2}$ miles) an individual was procured by large dredge, from a depth of 36 fms. and hard ground (December 20, 1900). Two others were procured at Woodstock beach (Table Bay).

They were very hardened and quite stiff, 20-25 mm. long by a breadth of 13-19 and a height of 0.8-1.0, the breadth of the brim of the back 3-4, that of the foot 8-10, the tail 3-4 mm. long.—The colour of the living animal seems to have been yellowish, but is now a yellowish white.

The form as usual; the back all over covered with more or less small nodules of a diameter up to 7.5 and a height to 0.75 mm. (fig. 16); along the middle of the back sometimes a series of somewhat larger nodules, which formed a sort of median crest; the gill seemed formed of 8-leaves about 2 mm. high (when retracted).

The eyes, which were nearly sessile, of a diameter of 0.08 mm. with large yellow lens; the otocysts of a diameter of 0.08, full of otokonias. The skin everywhere with masses of hard spicules, which ascended through the nodules of the back.

The whitish *bulbus pharyngeus* with prominent rasp-sheath 4-6 mm. long by a height of 4-5 and a breadth of 3.5-4; the lip disc covered with a strong colourless cuticula. The very slightly yellowish rasp of the *tongue* seemed to contain 25 series of plates, the rasp-sheath 20, the total number of rows thus being 45. The plates colourless; the height of the outermost (fig. 18), about 0.06 mm., rising to 0.22; of the common hook-shaped form (fig. 17).

The large stomach 8 mm. long by a breadth of 3.5, very projecting; the liver yellowish white.

The form here examined seems to be an *Archidoris*, but could not, on account of its hardened state, be sufficiently examined. It would perhaps be preferable not to give a specific denomination.

2. *ARCHIDORIS* ?? *SCRIPTA*, Bgh. n. sp.

Color albidus, notæo punctis et striolis nigris interruptus; margine limbi dorsalis flavo.

Pl. XI., figs. 19-25.

Of this form three individuals were sent, procured off the Hongazi River by dredge, now unfortunately very hardened and stiff.

The lengths of the specimens were 10, 15, and 21 mm. The largest had a breadth of 13 and a height of 7 mm.; the brim of the back 4; the height of the gill-leaves 2·5; that of the rhinophores 2·5; the length of tentacles 1·5 mm.; the breadth of the foot 5·5, and the length of the tail 3·5 mm.—The colour was white; the back showed, irregularly spread, very finely punctuated dots and stripes (fig. 19); the margin of the brim of the back yellow; the sole of the foot with clear, grayish shades. A white intestine shone through the middle of the back and of the foot.

The circumference oval, the body somewhat depressed, the back smooth, its brim rather broad; the rhinophores and the gill with its 6-leaves, both situated rather before and behind. The tentacles conical; the foot rather broad, with prominent brim, its anterior margin with deep furrow and its upper lip medianly cleft; the tail projecting behind the body proper.

The central nervous system as usual. The diameter of the eyes 0·14 mm., the lens very yellow; the diameter of the otocysts 0·10; they were quite packed with otokonia; in the lamellæ of the club of rhinophores some long, very calcified spicules of a diameter of 0·007 mm.; no spicules in the tentacles; the skin of the back with numerous, very calcified spicules (fig. 20), mostly of a diameter of 0·013-0·016 mm.

The buccal tube strong, 2 mm. long. The whitish *bulbus pharyngeus* 3 mm. long, with strong prominent rasp-sheath; the lip disc with nearly colourless rather thin cuticula. The *tongue* broad; in the clear-yellowish rasp 16 plates, in the rasp-sheath 15, of which the two hindermost are not fully developed, the total number of plates being thus 31. The plates nearly colourless; the height of the innermost 0·08, of the outermost 0·04 mm., of the next 0·08, rising to 0·20 mm. The number of plates in the rows up to 42. They were of the common hook form (figs. 21-24), the outermost somewhat different (fig. 24a), but missing (fig. 21).

The white salivary glands flattened, lobate at the margin, 2 mm. long.

The liver 10 mm. long, brownish, its sides covered by the rather thick layer of the yellowish white hermaphrodite gland, in the lobes

of which there were no ripe genital elements. The whitish anterior genital mass 5.5 mm. long; the long spermduct (fig. 25a) forms a coil of fine windings; the penis (fig. 25b) cylindrical, 5 mm. long, the glans moreover 2 mm., projecting in the thin præputium (fig. 25c), absolutely unarmed; the spermatheca 2 mm. in diameter, spermatocyst half as large.

The generic position of this form in the system of the Dorididæ, as hitherto framed, seems very uncertain. The want of armature of the lip disc, the nature of the rasp and the unarmed penis would seem to denote an affinity to Archidoris, but the habitus is quite different and the back quite even.

STAURODORIS, Bgh.

R. Bergh, System d. nudibranchiaten Gasteropoden, *l.c.*, 1892, p. 1093.

Eliot, Nudibranchiata. Fauna and Geography of the Maldivé and Laccadive Archipelagoes, ii., 1, 1903, pp. 557-558.—On some Nudibranchs from East Africa and Zanzibar. Proc. Zool. Soc. of London, 1903, ii., pp. 363-364.

Corpus non durum, subdepressum, dorso tuberculato; foveæ rhinophoriorum sicut fovea branchialis tuberculis marginalibus elevatis valviformibus defensæ; tentacula brevissima crassa, sulco marginali externo; branchia e foliis sat numerosis simpliciter pinnatis formata.

Penis et vagina inermes.

The genus belonging to the family of the Archidorididæ has, like the other genera, the lip disc merely covered by a simple cuticula, the radula shows the narrow rhachis naked and the pleuræ with a series of hook-formed plates. It differs from the other genera by the protecting valves of the rhinophores and of the gill; the leaves of the last are, moreover, simply pinnate.

To the genus belong:

1. *St. verrucosa* (Cuv.).

St. pseudoverrucosa, Jher.

St. Januarii, Bgh.

St. Bertheloti (d'Orb.).

St. (juv. ?) bicolor, Bgh.

St. ocelligera, Bgh.

M. mediterr., *atlant. or. et occ.*

2. *St. d'Orbigny* (Gray).

Hab. ?

3. *St. calva*, Eliot.
M. africano-indic.
4. *St. ? pustulata* (Abraham).
M. Pacific.
5. *St. ? depressa*, E.
M. africano-indic.
6. *St. ? pecten*, E.
M. africano-indic.

ST. VERRUCOSA (Cuv.).

Pl. XI., figs. 26, 27.

The single specimen sent had been procured on the shore amongst rocks at St. James. It was unfortunately very hardened.

The length of the animal was 8 by a breadth of 5 and a height of 3 mm.; the breadth of the gill star 3, the height of the gill-leaves 0·5, the breadth of the brim of the back 1·3 mm.; the breadth of the foot 3·5 mm.—The colour yellowish white.

The form oval, somewhat depressed. The rhinophores protected on each side by a little valva. The back covered all over with small and quite small rounded tubercles of a diameter up to 0·5 mm.; the gill formed of about 20 (?) simple leaves the protecting valves rather small; the foot not narrow, the tail rather short.

The cerebral and pleural ganglia quite distinct, smaller than the roundish pedal. The eyes of a diameter of about 0·12 mm.; that of the otocysts 0·10, they were packed full of otokonia of a length up to 0·016 mm. The skin (of the back) full of very calcified long spicules of a diameter up to 0·025 mm.; spicules of the same kind in quantity in the valves, and in the lamellæ of the rhinophores.

The mouth tube 1·5 mm. long. The *bulbus pharyngeus* together with the very projecting rasp-sheath 3 mm. long; the lip disc covered by a yellowish cuticle. The *tongue* with yellowish rasp that contained 12 series of plates and in the sheath 15, the total number of rows thus being 27; in the series up to 39 plates.* The nearly colourless plates of the common hook form (figs. 26, 27); the height of the outermost 0·03, the height of the plates rising to 0·12 mm.

* The number of series of plates and the number of plates in the series seem to vary much in the *St. verrucosa*. In a small series of specimens of the typical form the number of series varied from 40 to 73, with a number of plates in the series from 41 to 95. In the *St. bicolor* these numbers were 28 to 33 and 33 to 36; in the *St. Januarii* the number varied from 39 to 61 and 40 to 65.

The whitish salivary glands were nodular and seemed to be shorter than in the typical species.

The liver yellowish, of conical form.

The form here examined seemed to be the typical *St. verrucosa* (Cuv.) of the Mediterranean Sea and from both sides of the Atlantic.

DISCODORIDIDÆ.

R. Bergh, System d. nudibranchiaten Gasteropoden, 1892, p. 1095.

—Die Opisthobranchiaten d. Siboga Exped., 1905, pp. 98–118.

GEITODORIS, Bgh.

R. Bergh, Die Opisthobranchiaten. Rep. on Alaska. Bull. of the Mus. of Compar. Zoölogy at Harvard College, xxv., 10, 1894, p. 162 (–168).

Corpus ovale, depressum, notæo minute granulato vel lævi; tentacula digitiformia; branchia e foliolis tripinnatis formata.

Armatura labialis e baculis minutis composita. Radula lata; rhachide angusta nuda; pleuris multidentatis, dentibus internis fortibus hamatis, externis tenuissimis.

Penis inermis.

This genus differs from the other generic forms of Discodorididæ especially in the dimorphism of the plates of the radula.

The genus now contains :—

1. *G. complanata* (Verrill).

M. Atlant. occid.

2. *G. immunda*, B.

M. Pacific.

3. *G. Capensis*, B. n. sp.

M. Capense.

GEITODORIS CAPENSIS, Bgh. n. sp.

Pl. XII., figs. 2–5.

One specimen was sent, dredged off Glendower Beacon; it was very much hardened.

When alive it was of yellow colour. In the preserved condition it was of a length of 18 mm. by a breadth of 11 and a height of 6; the rhinophores 2 mm. high, the brim of the back 3, the height of the gill-leaves 2·5; the breadth of the foot 7, of its brim 1·5 mm.

The colour of the back yellowish, that of the gill a little darker; the body otherwise whitish; the white intestines were visible through the hind part of the back and of the sides.

The form as usual. The rhinophores standing very far forwards, with prominent sheaths, the club with about 15 lamellæ. The back nearly quite even with rather broad brim; the gill consisting of 6 leaves, standing very far backwards. The tentacles short, finger-like; the foot rather large, with prominent brim; the tail short.

The central nervous system as usual. The eyes, with yellow lens, of a diameter of 0.16 mm.; the otocysts of a diameter of 0.09, nearly filled by a mass of otokonion mostly of a diameter of 0.008 mm. In the skin (of the back) a number of scattered spicules which were not long nor very much calcified; almost none in the lamellæ of the club of the rhinophores.

The yellowish *bulbus pharyngeus* about 3 mm. long, so hardened that a sufficient examination was quite impossible. The yellow lip plates (fig. 2) composed of closely packed rods of a height up to 0.035 and a diameter of 0.009 mm. The *rasp* seemed in its rows to contain about 30 more regular and 10–15 quite thin plates on each side of the naked rather narrow rhachis. The plates nearly colourless, transparent, hard, rising to a height of 0.33 mm. The plates erect, fixed to the cuticula only by their lower end; the plates of the larger inner part of the rows strong, of peculiar hook form (figs. 3, 4), with a strong outer border; the smaller outer part (fig. 5) showed, without any transition, merely very thin rather long plates.

The liver yellowish-white. The whiter hermaphrodite gland covering the largest part of the liver; in its lobules were ripe genital elements. The anterior genital mass white; the penis seemed to be unarmed.

The animal seems to belong to the genus *Geitodoris*.

DIAULULIDÆ.

R. Bergh, System. *l.c.*, 1892, p. 1097 (–1100).—Die Opisthobranchiata d. Siboga Exped., 1905, pp. 118–136.

DIAULULA, Bgh.

R. Bergh, System, 1892, p. 1097.—Die Opisthobranchiata, *l.c.*, 1905, pp. 118–121.

1. DIAULULA CAPENSIS, B. n. sp.

Pl. V., figs. 19–22.

At Mossel Bay (Seal Island, S. by W., $1\frac{1}{2}$ miles) one individual was dredged from a depth of 11 fms. with bottom of sand and shells.

When alive it was "light-brown" in colour. In the preserved state it was very stiff and hardened, and of a yellowish white colour, the rhinophores only being brownish gray.

The length of the body was 25 mm. by a breadth of 15 and a height of 8; the height of the (retracted) rhinophores 2 mm.; the diameter of the gill hole 5 mm.; the height of the gill-leaves (retracted) 4; the brim of the back 3 mm.; the foot 8 mm. broad, its brim 2, the tail short.

The back was of a fine chagreen texture all over; the closely set (figs. 19, 20) small papillæ of a height up to 0.16 mm. The region of the (retracted) rhinophores somewhat prominent. The (retracted) gill composed of 8 apparently tripinnate leaves; the projecting anus subcentral.

The eyes of a diameter of 0.16 mm., with large clear-yellow lens. The lamellæ of the club of the rhinophores stiffened with long spicula. Coarse long spicules in quantity in the skin of the back, also ascending through the papillulæ and often projecting on their top (fig. 20).

The white mouth tube 2.5 mm. long. The white *bulbus pharyngeus* 4 mm. long by a height of 3, the lip disc covered by a strong yellowish white cuticle, the rasp-sheath rather projecting behind on the under side. The rasp of the strong *tongue* faint yellowish, containing about 15 series of plates, in the sheath 25, the total number of rows thus being 40; the number of plates in the rows about 35. The plates were nearly colourless; the height of the outermost 0.14 mm., the height rising to 0.285. The plates were of the usual hook form (fig. 21), the outermost somewhat slender (fig. 22).

The œsophagus 11 mm. long, the intestine appearing at the middle of the length of the liver, bending and passing backwards with a total length of 30 mm. by a diameter of 3. Its contents were animal matter and quantities of spicules pointed at both ends. The *liver* yellowish white, 12 mm. long by a breadth of 8 and a height of 7; with a deep median fissure through the anterior half of the upper side, divided by superficial furrows into several lobes, with a flattening of the under side towards the right. The gall-bladder on the left side of the cardia, 2 mm. high by a diameter at the summit of 0.4.

The grayish blood glands as usual.

The *hermaphrodite gland* with a whitish layer covering the upper side of the liver; the lobules contained ripe genital elements. The *anterior genital mass* white and yellowish white, 8 mm. long by a height of 6 and a thickness of 4.5; the large

prostata of a diameter of 4 mm., the globulous spermatheca of 2 mm. diameter.

This form seemed to be a *Diaulula* and very likely a new species.

2. *DIAULULA* ? *MOROSA*, B. n. sp.

Pl. V., figs. 23–26.

One specimen of this form was found on the shore at Mossel Bay.

It had a length of 14 by a breadth of 6 and a height of 3 mm., the height of the rhinophores 1·5, the diameter of the gill-aperture 2·5, and the height of the branchial leaves 1·5; the breadth of the foot 3·25 mm.—The back of this animal was of a uniform dark greenish gray colour, the foot white.

The form was elongate-oval, rounded behind and in front with somewhat prominent brim of the villous back; the lamellæ of the rhinophores not thin; the gill consisting of 10 simply pinnate leaves, protruding from the roundish gill-opening; the tentacles small; the foot shorter than the back, with prominent brim.

The back densely covered with rather low villi of a height up to 0·2 mm., stiffened with spicules in and often around them (fig. 23); the skin of the back containing masses of dark pigment and many spicules.

The *bulbus pharyngeus* 2 mm. long, whitish; the lip disc with a strong, much folded, colourless cuticle (no armature). The rasp of the *tongue* nearly colourless, with many rows of plates and many plates in the series; the plates colourless, reaching a height mostly of 0·016 mm., of the common hook form (fig. 24), the outermost (6) very thin and slender, with short basal plate, reaching a height of 0·14 mm. (figs. 25, 26).

The liver longish, 6 mm. long, clear grayish yellow.

The anterior genital mass whitish. The penis short, pear-shaped; the glans short, conical, with yellowish cuticle.

The generic position of this animal is quite uncertain; in many respects it would seem to belong to the *Diaululidæ*, but the leaves of the gill are simply pinnate.

THORDISA, Bgh.

R. Bergh, *System, l.c.*, 1892, p. 1098.—*Die Opisthobranchiata d. Siboga Exped.*, 1905, pp. 121–124.

THORDISA PUNCTULIFERA, B. n. sp.

Pl. VI., figs. 1–4.

In False Bay (Rockland Point bearing NW. $\frac{1}{4}$, N. $2\frac{1}{2}$ miles) three specimens were taken by large dredge, together with a species of

Chromodoris, from rocky bottom with many sponges in a depth of 23 fms.

The very hardened specimens varied in length from 11 to 16 mm. and resembled each other. The largest was 9 mm. broad by a height of 3·5; the height of the rhinophores nearly 2; the diameter of the gill aperture 1, the height of the gill-leaves 1·5, the breadth of the brim of the back 3, the breadth of the foot 3·5, and the length of the tail 1·5 mm.—The animal was of a uniform white colour, with small black roundish and more irregular spots spread over the back, sometimes too on the foot-brim; the brim of the back had perhaps been of another colour.

The form longish oval, with the broad brim of the back somewhat undulating. The back appeared under the lens covered all over with very small closely set tubercles of a height and diameter of about 0·10 mm.; the black points much larger than the tubercles, measuring up to 0·3 mm. The rhinophores with about 20 lamellæ and prominent end-papilla. The gill containing 5 tripinnate leaves. The tentacles appeared as very small prominences on the sides of the head. The brim of the foot not narrow, the tail short.

The central nervous system as usual. The eyes of a diameter of 0·12 mm.; the otocysts a little smaller, crowded with otokonias.

The small tubercles of the skin (fig. 1) with many cellular glands and spicules (fig. 2). The skin as well as the interstitial tissue crowded with calcified cells and long spicules.

The whitish *bulbus pharyngeus* about 3 mm. long, with prominent rasp-sheath; the lip disc clothed with a nearly colourless cuticle. The rasp of the *tongue* was nearly colourless and seemed to contain about 30 series of plates, the rasp-sheath about 30, the total number of rows thus being about 60. In the series on both sides of the rhachis (fig. 3) about 100 plates. The plates nearly colourless, the height of the 3 innermost 0·04–0·05–0·06, the height rising to 0·3 mm.; in the outermost it was 0·06–0·10–0·12–0·14–0·16–0·20, 0·25. They were of the usual hook form (figs. 3, 4); the 3 outermost being always of another form, erect, with rounded, finely pectinated end (fig. 4).

The salivary glands white, long, flattened. The posterior visceral mass (liver) 5·5 mm. long by a breadth of 3; flattened on the under side, yellowish.

The anterior genital mass 3·5 mm. long, whitish; the penis as well as the vagina without armature.

The tail of this animal is short, scarcely projecting behind the back, otherwise it resembles the *D. punctulifera*, B. (Neue

Nacktschnecken der Südsee II. Journ d. Mus. Godeffroy, Heft vi. 1874, taf. 1, figs. 19, 20), only known by the coloured figure of Graeffe.

GENUS (?).

Doris (Gen. ?) *pseudida*, B. n. sp.

Pl. VI., figs. 7-8.

Near Table Bay (Lion's Head bearing N. 63 E., 34 miles) four individuals were taken by shrimp-trawl from a depth of 154 fms. on a bottom with black specks. The three individuals sent were very hardened.

Two were 15 and 23 mm. long. The third, which was dissected, had a length of 33 by a breadth of 20 and a height of 14 mm., the rhinophores 1 mm. high; the brim of the back 5 mm. broad; the round gill-hole of a diameter of 3 mm., the height of the retracted gill-leaves 3 mm.; the tentacles 1 mm. long, the breadth of the foot 6, the length of the tail 2 mm. The animal was uniformly coloured whitish; a fine white line along the margin of the back.

The form longish-oval, the brim of the quite smooth back not narrow, overlapping the head and the tail, the rhinophores perfoliate; the gill formed of 6 tripinnate leaves, the subcentral anal papilla 3 mm. high. The tentacles short, finger-shaped; the brim of the foot rather narrow.

Calcified groups of cells and spicules seldom occurred in the skin.

The *bulbus pharyngeus* 7 mm. long by a height and a breadth of 5, the rasp-sheath not prominent, the lip disc clothed with a thick white cuticle. The rasp of the *tongue* yellowish, containing 9 series of plates, in the rasp-sheath about 15, the total number of rows thus being 24; the rows seemed to have about 25 plates on each side of the very narrow rhachis. The plates nearly colourless, the height of the 4 outermost was 0.06-0.12-0.14-0.16, rising to 0.37 mm. The plates of the usual hook form (fig. 7), with hook quite even, the outermost small (fig. 8).

The white salivary glands long, their last two-thirds flattened, 1 mm. broad, the remaining hinder part very thin, the efferent duct not short.

The large stomach very prominent, 8 mm. long by a breadth of 6; its contents were animal matter with quantities of pointed hard spicules. The intestine 2.8 cm. long by a diameter of 0.5-1 mm. The yellowish white liver short, conical, 14 mm. long with a hollow base (for the stomach), of 11 mm. diameter. The gall-bladder 4.5 mm. high by a diameter at its summit of 3.5.

The genital system very little developed, the penis apparently unarmed.

This form does not seem to belong to any of the hitherto established genera or even families of the cryptobranchiate Dorididæ.

GENUS (?).

Doris (Gen. ?) *perplexa*, B. n. sp.

Pl. VI., figs. 5-6.

Off Cape St. Blaize (N. by E. $8\frac{1}{2}$ miles) a specimen was taken by large trawl from a depth of 39 fms. on stony bottom, and in company with the *Doriopsilla capensis*.

It was very hardened but soft, coloured uniformly whitish, the back anteriorly slightly grayish brown. It was 25 mm. long by a height and breadth of 7.5; the breadth of the foot 4 mm.

The form longish, highest in the middle of the length, the quite smooth back separated from the sides by a narrow white margin; the rhinophores well in front, 2 mm. high, with the club bent somewhat backwards; the gill placed quite behind, 3 mm. from the end of the body, formed by 6 simply pinnate leaves about 1.5 mm. high; the tentacles very small lobes; the foot rounded in front; the brim rather narrow, the tail very short, passing into the back without distinct demarcation.

The central nervous system as usual. The diameter of the eyes 0.12 mm. No spicules in the skin.

The mouth tube 4 mm. long. The whitish *bulbus pharyngeus* 5 mm. long by a height of 4.5 and a breadth of 3.5; the rasp-sheath large, projecting downwards; the lip disc with a rather strong, nearly colourless cuticle. The rasp of the large *tongue* nearly colourless; the number of series of plates could not be determined. The series seemed to contain up to 46 plates on each side of the inconspicuous rhachis. The plates nearly colourless; the length of the basal plate of the innermost 0.10 mm.; that of the 4 outermost (fig. 6) was 0.08-0.12-0.18-0.22, rising to 0.37. They were of the common hook form, with wing of the basal plate (fig. 5).

The white salivary glands very long.

The stomach 5 mm. long by a breadth of 2. The intestine 17 mm. long by a breadth of 0.5-0.75, filled with indeterminable animal matter with masses of needle-shaped pellucid spicules. The large yellowish white liver, conical, 15 mm. long by a breadth of 5.

The genital system very little developed; no ripe genital elements were seen; the penis seemed unarmed.

This form could not be referred to any of the hitherto established genera. It had a smooth back with very narrow margin, simply pinnate gill-leaves. Moreover, no armature of the lip disc, and uniform hook-formed lingual plates.

GENUS (?).

Doris (Gen. ?) *glabella*, B. n. sp.

Pl. VI., figs. 9-13.

One specimen was procured off Buffalo Bay by shrimp-trawl from a depth of 30 fms. with sandy bottom, with stony Polyzoa. It was very contracted and hardened.

The colour was yellowish white, the gill more yellow, and the club of the rhinophores brownish. The length was 4 cm. by a height of 2.2 and a breadth of 2; the length of the club of the perfoliated rhinophores 3 mm.; the diameter of the prominent gill 11, its leaves—7 mm. long, the strong anal papilla 2 mm. high; the breadth of the foot 6 mm., the length of the tail 6.

The body somewhat compressed, the even back rounded, passing into the sides of the body. The 10 leaves of the gill mostly bifid or trifid, often branched, set in horseshoe form, simply pinnate (fig. 9).

The nervous system and the eyes as usual. In the skin, besides the enormous quantity of glandular cells, calcified cells and cell-groups, long, irregular grumous calcified spicula.

The mouth tube 6 mm. long. The *bulbus pharyngeus* 12 mm. long, 8 mm. broad, and 7 high; the thick rasp-sheath rather prominent; the lip disc with thick, yellowish cuticle, and a narrow armature of, as it were, chitinous cylinder-epithelium of a height of about 0.025 by a diameter of 0.007 mm. (fig. 10). The broad rasp of the *tongue* with about 60 series of plates, in the sheath moreover about 70; in the long rows on each side of the narrow naked rhachis about 200-300 plates. The plates clear yellow; the innermost (fig. 11) of a height of 0.08 mm., the three outermost 0.025-0.04-0.08 mm. high, the height of the plates from both ends of the rows abruptly rising to 0.25 mm. The plates were of the common hook form (fig. 12), never denticulated, the 1-2 outermost (fig. 11) small and somewhat irregular. A peculiar deformation was rather often seen in the different

series, and often several times in the same series (fig. 13); the point of the plates sometimes bifid.

The white salivary glands were long and thin.

The œsophagus 1.2 cm. long. The (liver-) stomachal cavity rather small; the intestine appearing at about the middle of the length of the liver, turning on the anterior genital mass and going backwards to the anal papilla. The length of the intestine 2.5 cm. by a diameter generally of 3 mm. The liver clear yellowish gray, rather short and thick, 12 mm. long by a diameter of 9, with a depression for the anterior genital mass.

The reno-pericardial organ rather roundish, of a diameter of 1.5 mm.

The anterior genital mass seemed of a rather complicated nature, but it could not be made out in the hardened specimen; it was about 15 mm. long by a diameter of 7-8. Its hinder part was formed by a sort of short pyramid, yellowish gray, of a height of 6 mm., by a base of 8, very likely opening in the vestibulum; the rest of the mass whitish and yellowish; the spermatheca globular, of a diameter of 3.5; the coil of the windings of the vas deferens very large, consisting of a longer prostatic and a shorter muscular part; the penis 6 mm. long, without armature.

This form cannot apparently be placed in any of the hitherto known genera of Dorididæ; it agrees with the *Chromodoris* and the *Halla* in the simply pinnate nature of the gill-leaves.

CHROMODORIDIDÆ.

R. Bergh, *System, l.c.*, pp. 1103-1112.—Die Opisthobranchiata d. Siboga Exped., 1905, pp. 142-168.

CHROMODORIS, Ald. et Hanc.

R. Bergh, *l.c.*, 1905, pp. 143-162.

1. CHROMODORIS ALBOLIMBATA, B. n. sp.

Pl. VI., figs. 18-24.

Off Sebastian Bluff (W. by N., $\frac{3}{4}$ N., 7 miles) one individual was taken by large dredge from a depth of 20 fms.; the bottom was coral and stones.

The animal was 15 mm. long by a breadth of 6 and a height

of 4; the height of the rhinophores 1·5; the entirely everted gill projected 2 mm., the diameter of the gill-star 6 mm., the length of the leaves up to 3; the brim of the back 1·5, the breadth of the foot 4 and the length of the tail 3 mm.—The colour clear reddish white, the brim of the back chalk-white.

The back quite even; the very fine gill with its 15 leaves (fig. 18) mostly extending out horizontally; the anal papilla submedian; the caudal and frontal veil about 1·5 mm. broad, the white brim finely punctuated; the tail projecting behind the back.

The diameter of the eyes 0·10 mm., the lens very clear yellow. The diameter of the otocysts 0·08. The brim of the back filled with sacks of very different size, stuffed with vesicles mostly 0·04 mm. in diameter.

The length of the mouth tube 2 mm. The whitish *bulbus pharyngeus* with the (fig. 19) prominent rasp-sheath 3 mm. long by a breadth of 2. The very strong (fig. 19) lip plate reddish brown, the elements, which were variously bent (fig. 20), of a length up to 0·06 by a diameter of nearly 0·005 mm. The rasp of the *tongue* yellowish, with many series of plates and a great number of plates in the series. The plates of usual form (fig. 23) and all with finely denticulated hook. On the very narrow rhachis small triangular pseudo-plates (fig. 21a) of a length short of 0·04 mm. The innermost plates denticulated as usual on both sides of the hook, 0·030 mm. high (fig. 21), the next 0·04 mm. high (fig. 22), the outermost about 8–10 plates only denticulated at the point (fig. 24).

The liver on the outside gray, in section black, 8 mm. long by a breadth of 3 and a thickness of 2·5, sausage-shaped; its fore-end and upper side covered by the whitish yellow hermaphrodite gland. The anterior genital mass whitish yellow, about 3·5 mm. long; the penis 1·5 mm. long.

This form is different from the 13 species of *Chromodoris* described by Eliot (*l.c.*, iv., 1904, pp. 386–399) from Zanzibar; perhaps it is identical with one of the many species described from the Indo-Pacific Seas.

2. *CHROMODORIS EUELPIS*,* B. n. sp.

Pl. VI., figs. 14–17.

One specimen was procured off Umloti River mouth by large dredge from a depth of 45 fms. and a hard bottom of sand and shells on December 18, 1900.

* 'Ευελπίς, Good Hope.

The specimen, killed with cocaine and expanded but somewhat hardened, had a total length of 18 mm. by a breadth of 4 and a height of 3 mm.; the frontal as well as the caudal veil projected 2.5 mm., the first 5 mm. broad, broader than the caudal; the height of the rhinophores 2, of the gill 2.5 mm.; the breadth of the foot 3, the length of the tail 7 mm.—The animal of a uniform yellowish colour, the back and the sides of the body very finely punctuated with black dots.

The form as usual, the frontal and caudal veil very pronounced, the back quite even; the anterior part of the brim of the back and the caudal veil showed a series of slightly prominent bags (as seen in so many *Chromodorides*) with contents of roundish and pear-shaped elements; the gill, far back on the back, formed of eight leaves; the brim of the back prominent; the tentacles short, finger-shaped, the tail rather long.

The dirty whitish *bulbus pharyngeus* 3 mm. long. The slight yellowish armature of the lip disc 0.50 mm. high by a breadth of 0.25, the elements (fig. 14) of a height up to 0.035 mm., with somewhat thicker bent end. The rasp of the *tongue* slightly yellowish with many rows of plates, and very many plates in the series. The plates nearly colourless, of a height up to 0.035 mm., the outermost measuring 0.016. They showed (figs. 15, 16) a plump bifid hook, the outermost of which (fig. 17) was more irregular.

The long salivary glands white. The liver grayish, sausage-shaped, 8 mm. long by a diameter of 2. The anterior genital mass whitish.

Perhaps this form represents a new species. No form of *Chromodoris* seems to have been hitherto described from the region of the Cape; this species does not agree with any of those from Zanzibar described by Eliot.

3. *CHROMODORIS*, sp.

Pl. VI., figs. 25–26.

Three specimens were procured in False Bay (Rockland Point bearing N. $\frac{1}{4}$ N., $2\frac{1}{2}$ miles) by large dredge from rocky bottom with many sponges in a depth of 23 fms., together with the *Thordisa punctulifera*.

The specimens, which were much hardened, varied in length from 13–17 mm. The largest was 13 mm. broad by a height of 4.5; the height of the rhinophores 2.5, the breadth of the brim of the back

3.5, the height of the gill 2.5 mm., the breadth of the foot 4, the length of the tail 2 mm. The animal was of a uniform whitish colour, the tubercles of the back white, the gill grayish.

The form was longish oval; the back covered all over with small rounded tubercles of a diameter of about 0.25 mm. These were also very distinct on the margin of the gill and of the rhinophore cavities; the gill seemed formed of about 12 simply pinnate leaves. The tentacles appeared merely as small tubercles.

The central nervous system, eyes and otocysts as usual. In the skin of the back calcified cells and spicules were in abundance.

The mouth tube 2.5 mm. long. The whitish *bulbus pharyngeus* 3.5 mm. long by a breadth and a height of 3, with rather prominent rasp-sheath: the lip plates large, nearly joining above and below, about 2 mm. high, 1 mm. broad, yellow; their elements (fig. 25) somewhat bent, 0.08 mm. high. The rasp yellow, with many series of plates. The number of plates in the series could not be determined. The plates (fig. 26) nearly colourless, of a height up to 0.08 mm., the hooks finely denticulated.

The salivary glands long, white, flattened.

The stomach large, 3 mm. broad, covering the anterior half of the liver. The posterior visceral mass (liver) yellowish white, short, conical, 7 mm. long by a breadth of 3.5.

This form is very likely identical with one of the many hitherto described species of *Chromodoris*.

APHELODORIS, B.

R. Bergh, System, *l.c.*, 1892, p. 1112.

APHELODORIS ? ? BRUNNEA, Bgh. n. sp.

Pl. XI., figs. 28–29; Pl. XII., fig. 1.

One specimen was sent for examination. It had been captured at low tide on rocks at Kalk Bay.

The length of the animal was 4.7 cm. by a breadth of 1.5 and a height of 0.9 cm.; the diameter of the gill aperture was 3 mm., the height of the retracted gill 3 mm.; the breadth of the brim of the back 2.5 mm.; the foot 8 mm. broad, its brim measured 2.—The back was of a brown colour, the whole of the under side whitish, and on the sides of the body were some scattered grayish brown spots (the colour rubbed off?); the club of the rhinophores brownish, so, too, the rhachides of the gill-leaves.

The form of the animal longish, somewhat narrow and depressed, the body quite smooth. The rhinophore-sheaths, immediately behind the anterior end of the proper back, about 1.5 mm. projecting, their opening obliquely truncate; the rhinophores about 2 mm. high, the club perfoliated, the lamellæ rather numerous, thin. The gill rather contracted, composed of 8 tripinnate leaves, situated at the posterior end of the back. The tentacles short, as it were, refolded on the top. The foot rather narrow throughout its whole length, rounded before and behind; the tail 3 mm. long, not extending beyond the back.

The *central nervous system* quite as in allied forms. The nearly sessile eyes of a diameter of 0.12 mm., with yellow lens. The otocysts a little larger. In the lamellæ of the rhinophores no spicules, which are absent also in the skin of the body.

The whitish mouth tube rather long (5 mm.). The *bulbus pharyngeus* short, clumsy, 4 mm. long, whitish; the labial disc covered over by a rather strong, bright yellowish cuticle; the rasp-sheath hardly prominent. The rasp bright yellowish, containing 9 series of tooth plates, in the short and thick sheath 20 series, of which two are not fully developed; the total number of series 29. In the series about 40 plates. The plates nearly colourless; the height of the three outermost 0.07—0.10—0.16, rising to 0.25 mm. farther inwards. The outermost tooth (fig. 29a) more erect, all the others of the common hook form (fig. 29); the innermost (fig. 28) with low hook, 0.07 mm. in height.

The yellow *salivary glands* about 10 mm. long, their posterior half very thin, folded in the middle.

The oesophagus short, 2 mm. long. The stomach quite free, 13 mm. long by a diameter of 8, filled with yellowish animal matter of undeterminable nature. The intestine (26 mm. in length) running from the anterior end of the stomach straight backwards to the white conical anal papilla.

The posterior visceral mass (the liver) 20 mm. long by diameter of 7, the anterior end obliquely truncate, the posterior a little attenuated, roundish; the colour of the surface yellowish white, with a number of groups of small white nodules (lobules of hermaphrodite gland); the liver substance more yellow. The pear-shaped gall-bladder 4 mm. long.

The reno-pericardial organ (renal syrx) whitish, of a length of 2 mm.

In the lobules of the hermaphrodite gland oogenous cells and bundles of zoosperms. The *anterior genital mass* white, somewhat compressed, 10 mm. long by a height of 4 and a breadth of 3 mm., rather hard and difficult to examine (fig. 1). The hermaphrodite

duct forms a little coil of windings (fig. 1a). From the anterior of the mucous gland (fig. 1b) there issues a long, rather bent and particular organ (fig. 1cc) that opens in the vestibulum genitale * (fig. 1d); the walls of this milk-white organ are rather thick, the cavity narrow (the prostatic part of a kind of vas deferens?). The globular spermatheca (fig. 1e) of a diameter of 3·25 mm., at its side the much smaller pear-shaped spermatocyst. The efferent ducts of the genital system absolutely unarmed.

The systematic position of this form is very doubtful. It may, perhaps, be referred to the Chromodorididæ and placed in the neighbourhood of *Aphelodoris*.

POROSTOMATA.

DORIOPSIDIDÆ.

R. Bergh, *l.c.*, 1892, pp. 1114–1122.

I. DORIOPIS (Pease), Bgh.

1. D. CAPENSIS, Bgh. n. sp.

Limbus dorsalis serie macularum nigrarum ornatus.

Pl. XIV., fig. 4.

One specimen of this form had been taken off Umlanga River mouth by shrimp-trawl.

It was rather contracted and somewhat bent, rather soft. The *colour* was yellowish white, but the brim of the back showed at the margin somewhat roundish black patches; the tip of the branchial leaves grayish. The *length* was about 18 mm. by a height of 6 and a total breadth of 11, of which 3 on each side belonged to the brim; the breadth of the foot 7 mm., the brim 1·5 mm. broad, the length of the tail nearly 5 mm.; the diameter of the branchial star 7 mm., the length of the gill-leaves 3 mm.

The form was as in other Doriopsides; the brim of the even back very undulating; the rhinophores situated far forward, the gill far backward, consisting of 5 leaves; tentacles were not visible; the tail of the foot not short, projecting behind the body proper.

The central nervous system whitish, of usual relations, the buccal ganglia situated between the salivary glands (*gl. salivales*). The very

* A small, roundish multicellular ganglion (genitale) was attached in the neighbourhood of the vestibulum.

short-stalked eyes of a diameter of 0.10 mm. Hardened spicules were not found either in the lamellæ of the club of the rhinophores or in the skin of the back.

The yellowish *pharyngeal cone* nearly 2 mm. long; at its base the secondary salivary gland (*gl. ptyalinā*), consisting of two halves adjoining each other. The *bulbus pharyngeus*, whose foremost end lies in the pharyngeal cone, as usual; at its hinder end the small oval salivary glands proper. The œsophagus thicker but shorter than the bulbus. The posterior visceral mass (liver) yellow, 8 mm. long by a breadth of 4, truncate in front, the slit (so characteristic in the Doriopsidæ) in the hinder end, 3 mm. long.

The pericardium as usual; the blood gland yellowish white.

The *anterior genital mass* somewhat compressed, 2.5 mm. long, whitish and white (the mucous gland). The glans penis provided in the usual way with the (quincuncial) series of hooks; the slightly yellowish hooks (fig. 4) relatively strong, of a height up to 0.035 mm., the armature continued up in the vas deferens only for a short distance.*

The Doriopsides vary very much in colouration; still, this form seems to represent a new species.

2. DOR. CALLOSA, Bgh. n. sp.

Pl. VIII., figs. 1-4.

Two specimens were procured by dredge at "Rocky Bank" in False Bay on rocky bottom in a depth of 17-27 fms.

One of them was 15 mm. long, the other 25 mm. by a breadth of 15 and a height of 6; the height of the rhinophores 2, the brim of the back 4.5 mm. broad, the diameter of the gill-aperture 3, the breadth of the foot 8 (of its brim 2).—The colour was whitish, the border of the back proper blackish, as also the fore-part of the back; there were besides a few black patches spread over the back. The back proper showed, all over, long spicules shining through, crossing each other irregularly in all directions; on the brim the spicula were more scattered, whiter, and mostly running transversely towards the margin. On the under side of the brim the radiation was less pronounced.

The form somewhat elongated; the white strongly foliated rhino-

* In the vagina of an individual of *Platydoris arrogans* I found the (torn out) penis of another individual (*cf.*, my "Malacol. Unters.," ii. (Heft xii.), 1877, p. 517). Sometimes individuals of Doriopsides and Pryllidiidæ are seen, in which the armature of the penis is wanting.

phores standing quite anteriorly ; the back quite even, but with many small nodules at its junction with the margin. The gill-hole far behind, with prominent margin ; the number of leaves of the gill 6. The mouth a fine pore, no visible tentacles. The foot rounded in front, the tail short.

The central nervous system as usual ; the buccal ganglia (fig. 4) much smaller than the salivary glands. The eyes 0·14 mm. in diameter, with large yellow lens ; the otocysts 0·10 mm. in diameter, filled with otokonina. The skin full of spicules of the most different sizes, form, and degree of calcification (fig. 3). The most of the long spicules of a diameter up to at least 0·05 mm., mostly smooth, sometimes a little thorny, mostly clear, sometimes even blackish. In the interstitial tissue masses of spicules ; as also in the axis of the rhinophores, but almost none in the lamellæ.

The mouth tube about 4 mm. long, white. The glandula ptyalina about 1 mm. broad, rather thick. The transparent *bulbus pharyngeus* (fig. 4a) unusually, nearly 17 mm., long by a general diameter of 0·4 mm. ; at its hinder end the salivary glands rather large (fig. 4bb). The œsophagus rather short and wide (fig. 4c) ; the intestine 6 mm. long. The liver a little flattened, in nearly its anterior half very compressed by the anterior genital mass, yellowish white, 10 mm. long by a breadth of 5, the cleft in the hinder end 1·5 mm. long.

The hermaphrodite gland clothing the largest part of the liver, of a similar colour, and with ripe genital elements in its lobules. The large anterior genital mass yellow and white, 6 mm. long by a height and breadth of 4. The form and the armature of the penis as usual (figs. 1, 2).

This form is specifically different from the *D. spiculata*.*

3. DORIOPSIS CÆSIA, B. n. sp.

An individual was taken by dredge near Roman Rock Lighthouse (SE. $\frac{1}{2}$ S., $1\frac{1}{4}$ miles) from a bottom of sand and shells in a depth of 10 fms.

The *living animal* is noted to have been "bluish." Preserved, it was whitish with the margin of the back more grayish, the rhinophores yellowish. The length was 14 mm. by a breadth of 7·5 and a height of 4·5 ; the height of the rhinophores 2, the diameter of the gill 4, the breadth of the brim of the back 3, the breadth of the foot 3 mm.

* R. Bergh, Die Nacktschnecken der Südsee. Journal d. Mus. Godeffroy, Heft xiv., 1878, p. 37. taf. ii., figs. 13-15.

The form of the body oval; the rhinophores rather large, the gill formed of 8 rather low (simply?) pinnate leaves; the back quite even with undulating broad brim, the frontal veil rather large. The animal did not at first sight look like a *Doriopsis*.

The central nervous system as usual.

The glandula ptyalina large, brownish. The bulbus pharyngeus with the gland. salivales (and the buccal ganglia) as usual, the more brownish oesophagus rather short. The liver dirty-yellowish, sausage-shaped, 6 mm. long by a breadth of 3, the cleft in the hinder end 3 mm. long.

In the lobes of the thin layer of the hermaphrodite gland ripe genital elements, the ampulla of its duct strong, yellowish white. The anterior genital mass 4 mm. long by a height of 3.5 and a thickness of 2.5. The penis whitish; the everted prominent glans of a diameter of 0.25 mm., covered with about 25 quincunx-series of hooks of a height up to 0.08; the armature continued for a short distance up into the vas deferens, where the number of series seemed to be smaller; the hooks weaker, with larger basal part of a diameter of 0.04 mm.*

4. *DORIOPSIS*, sp.

Pl. VIII., figs. 5-6.

At Swart Klip (NE. $\frac{1}{4}$ N. 1 mile) an individual was taken by dredge from a depth of ten fms. and from a bottom of broken shells (November 17, 1902).

The contracted and very hardened specimen was 16 mm. long by a breadth of 6 and a height of 5, the breadth of the foot 5.5 and the length of the tail 5.5 mm.—The colour is now whitish, but had very likely been grayish, the back and the sides still retaining large patches of this colour; the rhinophores and the gill whitish.

The form as usual; the head rather large, the rhinophores with 10-12 strong lamellæ, and a small papilla at the top; the back quite even; the gill, standing nearly on the middle of the back, consisting of 6 pinnate leaves; the brim of the back as well as of the foot a little projecting; the whitish penis (fig. 5) projected as a cylinder of a height of 1 mm., and from its top the armed end of the vas deferens, 1.5 mm. long (figs. 5, 6): the tail prominent beyond the end of the back.

The central nervous system as in other *Doriopsides*.

* A dark-blue variety of the so varying *D. nigra* is known from the Southern Japanese Sea (R. Bergh, Beitr. zur Kenntniss d. Japan. Nudibranchien, I. Verh. d. k. k. Zool. Bot. Ges. in Wien, xxx., 1880, pp. 181-184).

The bulbus pharyngeus, the œsophagus, and the gl. ptyalina as in other Doriopsides. The liver short-conical, truncate in front, the length 7 mm., the colour yellowish gray; scarcely any fissure of the hinder end could be seen.

The everted part of the vas deferens (fig. 5) 0.14 mm. broad, showing 10–12 irregular quincunx series of thorns; these last a little bent, clear, colourless, mostly 0.02 mm. high (fig. 6).

DORIOPSILLA, B.

R. Bergh, *System, l.c.*, 1892, p. 1123;—*l.c.*, 1905, pp. 178–180.

DORIOPSILLA CAPENSIS, B. n. sp.

Pl. VIII., fig. 7.

Along with *Doris perplexa* a specimen of this form was procured by large trawl at Cape St. Blaize.

The rather stiff specimen measured 15 mm. in length by a breadth of 10 and a height of 7; the breadth of the nearly straight brim of the back was 2 mm., that of the foot 9. It was uniformly coloured whitish, the nodules of the back white.

The form as usual; the back covered all over with small rounded nodules; the gill situated far behind, formed of six leaves of the height of 2 mm.

The central nervous system as usual, the buccal ganglia seemed to be situated in its immediate neighbourhood. The eyes were somewhat flattened, of a diameter of about 0.25 mm. The back filled full of calcified cells, groups of cells, and spicules proper (of a diameter up to 0.06 mm.).

The gl. ptyalina white, flattened, 3 mm. broad. The very thin *bulbus pharyngeus* nearly 4 mm. long, the gl. salivales as usual, the œsophagus very short.

The large intestinal mass (liver) 10 mm. long by a breadth of 6; the length of the cleft in the hinder end 1.75 mm. The dirty-yellow liver on its sides for a breadth of 3 mm. covered by the transverse, yellowish white bands of the hermaphrodite gland, in its lobes ripe genital elements. The anterior genital mass meniscus-shaped, 6 mm. long, whitish, and dirty yellowish. The penis as usual, the diameter of the glans (fig. 7) at its point 0.10 mm.; the hooks small, reaching a height of 0.013 mm.

At South Head (E. by S. $\frac{1}{2}$ S., 25 miles) nine individuals of probably the same animal were caught by shrimp-trawl from a depth of 190 fms. with a bottom of green sand and black specks.

The (five) specimens sent, very hardened, varied in size from 17 to 23 mm. The largest was 12 mm. broad by a height of 7, the brim of the back 4 mm. broad, the breadth of the foot 7, the 6 gill-leaves 3 mm. high. The colour as above. Two individuals showed a few roundish small patches on the back.

The skin of the back quite as above. So, too, the thin *bulbus pharyngeus*. The liver sausage-shaped, 8 mm. long by a breadth of 5, the cleft in the hinder end 2.5 mm. long.

DORIDIDÆ PHANEROBRANCHIATÆ.

R. Bergh, System, *l.c.*, 1892, pp. 1129–1160.

DOR. PHANEROBR. NON SUCTORIÆ S. POLYCERIDÆ.

R. Bergh, *l.c.*, pp. 1133–1147.

TRIOPA, Johnston.

Johnston, Miscell. Zool. Ann. of Nat. H., 1, 1838, p. 123.

R. Bergh, On the nudibr. gaster. Moll. of the North Pacific Oc., ii. (Dall, Sc. res. of the explor. of Alaska, ii.), 1880, pl. xiii. (v.), figs. 15–20; pl. xiv. (vi.), figs. 21–22; pl. xv. (vii.), figs. 12–13.—System d. nudibranch. Gasteropoden., *l.c.*, 1892, p. 1139; *l.c.*, 1905, pp. 185–187.

Corpus vix depressum; limbus frontalis angustior cirrhis granulosus ornatus, margo dorsalis cirrhis subclavatis instructus; rhinophoria retractilia clavo perfoliato; branchia paucifoliata foliolis tripinnatis; tentacula sat brevia obtusa canaliculata.

Armatura labialis et malaris nulla. Radula sat angusta rhachide nuda; pleuris dentibus lateralibus duobus majoribus et serie dentium externorum quorum modo intimus hamo rudimentario præditus.

Glans penis armata.

The rather narrow frontal brim is provided with somewhat granular appendages, and the margin of the back with more club-shaped ones; the gill is formed of a few (3–5) tripinnate leaves. The lip disc is clothed with a simple cuticle. The rasp of the tongue not broad; the rhachis naked; the pleuræ contain two large lateral plates and a series of smaller flattened plates. The glans of the penis armed with series of hooks.

Some few species of the genus are known.—

1. *Tr. clavigera* (O. Fr. Müller).

M. Atlant., Mediterr.

2. *Tr. lucida*, Stimpson.
M. capense.
3. *Tr. Catalinæ*, Cooper.
M. Pacific.
4. *Tr. Yatesi*, Angas.
M. Pacific.
5. *Tr. longicornis*, B.
M. Indic.
6. *Tr. (?) gracilis*, Pease.
M. Pacific.
7. *Tr. (?) tristis*, B.
M. Indic.

TRIOPA LUCIDA, Stimpson.

Stimpson, Deser. of some new Marine Invertebrata. Proc. of the
Ac. of Nat. Sc. of Philadelphia, vii., 1856, p. 388.

Pl. XII., figs. 6-7.

One specimen was sent, procured near Tugela River mouth, along
with *Idaliella amœnula*.

The animal is now of a uniform whitish colour.* The length is
9 mm., by a breadth of the body proper of 3·5 and a height of 3 ;
the length of the papillæ of the back reaching up to 3 mm., that of
the leaves of the gill 2·5 ; the breadth of the foot 4 mm.

The head with perpendicular mouth ; the tentacles truncate,
somewhat folded up. The frontal brim rather narrow with
8 appendages of different sizes, the highest somewhat nodular in
their upper half. The margin of the back otherwise not project-
ing, but rising through its whole length in club-shaped appendages,
on each side 15-17 (Stimpson mentions a number of about 40 in all).
The clubs (fig. 6) mostly of about the same size, slightly nodular (in
their upper half), the lower half stuffed with long strong spicules,
and in the point of the club a roundish bag.† The back smooth ;
the gill consisting of 3 strong, quite separate leaves, of which the
lateral are bifid ; the anal papilla as usual. The sides of the body
rather high. The foot at least as broad as the body proper.

The intestines shone dark-grayish through the foot.—The nervous
system as in the typical species. The short-stalked eyes of a

* According to Stimpson the "colour is uniform transparent white, except
that the tentacles, branchiæ, and appendages are all of yellowish colour towards
their extremities. Length 0·8 inch. Simon's Bay, Cape."

† Cf. Bergh, *Polyceraden*, l.c., ii., 1881, p. 642.—Bergh, *Alaska* (Dall), ii.
1880, p. 264, pl. xiii., figs. 16-17.

diameter of 0·075 mm.; the otocysts of a diameter of 0·08 mm., filled with otokonia of a diameter up to 0·009 mm. The skin of the back, the appendages of the back and the stalk of the rhinophores (but not the lamellæ) full of very long, very hardened spicules of a diameter up to 0·035 mm. The interstitial connective tissue filled with spicules.

The *bulbus pharyngeus* scarcely 1 mm. in length; the hardened state of the organ did not permit a thorough examination. The lip disc only clothed with a thin cuticle. The number of rows of tooth-plates altogether perhaps about 55, on the outside of the lateral plates about 15 outer. The plates were nearly colourless; the length of the second lateral plate was 0·06 mm., that of the first of the outer plates 0·037, of the outermost 0·029 mm. The first and second lateral plates (fig. 7*ab*) as formerly described * in *Tr. clavigera*, so too the outer plates (fig. 7*c*).

The posterior visceral mass grayish brown, the anterior genital mass whitish. The armature of the glans was not seen.

The form here examined is no doubt the *Tr. lucida* of Stimpson, which hitherto was only known from his imperfect description.

NEMBROTHA, Bgh.

R. Bergh, System der nudibranchiaten Gasteropoden, *l.c.*, 1892, pp. 1144–1145.—Die Opisthobranchiata d. Siboga Exped., 1905, pp. 194–202.

Corpus limaciforme, fere læve; rhinophoria retractilia clavo perfoliato; branchia in medio fere dorsi sita, paucifoliata, foliolis bi- vel tripinnatis; tentacula brevia lobiformia; podarium angustius.

Armatura labialis debilis vel nulla. Radula non lata; rhachis dente subquadrato applanato; pleuræ dente laterali (primo) falci-formi et dentibus externis compluribus depressis simplicibus.

Glandula hermaphrodisiaca hepate connata; prostata nulla; glans penis aculeis vel hamis armata.

Outwardly the Nembrothæ are not always easily to be distinguished from the Trevelyanae; the *number of their branchial leaves is smaller* than in this genus, but the anatomy shows very important differences. The nature of the *rasp* is very different; and the *hermaphrodite gland* clothes (as common in other allied forms) the liver; there exists no special prostata, and the (glans) *penis* is armed.

* R. Bergh, Beitr. zu einer Monogr. d. Polyceraden, ii. Verh. d. k.k. zool. bot. Ges. in Wien, xxx., 1881, p. 643. taf. xiii., fig. 9*ab*; taf. xiv., figs. 2–3.

A small number of species is known hitherto, excepting the *N. gratiosa* of the Mexican Gulf,* only from the Philippine Seas (Cap) and the Pacific Ocean.

1. *N. nigerrima*, Bgh.
2. *N. Kubaryana*, B.
3. *N. diaphana*, B.
4. *N. gracilis*, B.
5. *N. morosa*, B.
6. *N. cristata*, B.
7. *N. gratiosa*, B.
8. *N. rubropapulosa*, B. (Siboga).
9. *N. lineolata*, B. (Siboga).
10. *N. Amitina*, B. (Siboga).
11. *N. capensis*, Bgh. n. sp.
12. *N. sp.* (*Semperi*, B.).
13. *N. (?) rubro-ocellata*, B. (Siboga).
14. *N. (?) Edwardsi* (Angas).

NEMBROTHA CAPENSIS, Bgh. n. sp.

Pl. XII., figs. 8-17.

Of this form I had three specimens to examine, procured at rocks, Kalk Bay.

The two larger were examined by dissection, more particularly the largest. When alive the colour was "dark blue."

The *length* of the specimens was 3·8-4·2 and 6·7 cm. The latter, the largest, had a height of 2 cm. at the gill, which was about 8 mm. high; the breadth 1·2 cm., that of the back proper 1·1; the breadth of the foot 7 mm., the height of the club of the rhinophores 4 mm.

The colour was uniformly deep blackish blue; the sole of the foot somewhat yellowish white.

The *form* of the animal, as usual in the Nembrothæ, rather compressed. The short tentacles, as it were, refolded on the top; the sheath of the rhinophores somewhat prominent, the club of the conical rhinophores with about 30 lamellæ and a black terminal papilla. The true back limited by a low brim; the gill situated before the middle of the back, the number of the gill-leaves 7, their form as usual. The anal papilla completing the gill ring 1·75 mm. high. The foot as usual in the Nembrothæ.

* R. Bergh, Rep. on the Nudibranchs (Blake Expedition). Bull. of the Mus. of Comparative Zoölogy of Harvard College xix., 3, 1890, pp. 172-175. taf. ii., figs. 1-5; taf. iii., figs. 1-4.

The *central nervous system* as usual. The diameter of the almost sessile eyes 0.10 mm.; neither in the rhinophorial lamellæ nor in the skin were spicules seen.

The short mouth tube with the inside black. The clumsy *bulbus pharyngeus* (fig. 8) oval in circumference, with a breadth and height of 4 mm., of a length of 6, the rasp-sheath moreover projected 2 mm.; the labial disc yellowish white, the perpendicular mouth downwards, with strong grayish folds; the cheeks clothed with an especially downwards strong grayish cuticle. On the upper side of the bulbus the rather narrow palate shone blackish through, on each side accompanied by a strong yellowish or grayish white glandular mass (fig. 8). The rasp of the *tongue* yellow, containing (in the two specimens) 12 series of tooth-plates, in the sheath moreover 10–12 series, of which the two hindmost were not quite developed; the total number of series being thus 22–24. The median and outer plates yellow; the large lateral ones colourless, transparent; the breadth of the median plates 0.56 mm., the length of the lateral about 1 mm.; the plates, especially the lateral, were very hard. The median plates (fig. 9) of usual form, but scarcely with any thickening of the foremost edge; the lateral (figs. 10–12) very clumsy, broad, somewhat bent, with short simple hook; the number of outer plates was 5 (rather seldom 6), their form (figs. 13, 14) as usual.

Salivary glands of the usual kind were wanting, being represented by the glandular masses on the upper side of the bulbus pharyngeus.

The *oesophagus* rather short. The *intestine* rose to the surface of the hinder visceral mass (liver) at about the limit of its first and second third, made some large windings on the upper and right side of the genital mass, and ran on the right side of the liver to the black anal papilla; the whole length about 5 cm. by a nearly constant diameter of 2.25 mm.

The posterior visceral mass yellowish gray, 15–17 mm. long by diameters of 10–9, with rounded anterior and posterior end; the cavity of the *liver* (stomach) rather large, its substance somewhat more grayish than the surface, which was nearly quite covered by the thin yellowish layer of the groups of lobules of the hermaphrodite gland. The whole of the digestive tract was quite empty.

The *blood* gland blue, of oval form, 3.5–5.5 mm. long, rather thick, composed of quite small lobules; fixed to the bend of the intestine.

In the lobules of the *hermaphrodite gland* ripe sexual elements. The anterior *genital mass* pear-shaped, narrower towards the anterior end, 8 mm. long by a height and a breadth of 6–7; the connected efferent ducts projected moreover 3 mm., were black on

the outside and inside. The whitish seminal duct making several windings, when unrolled 2·5 cm. long, continued in the blackish *penis* sack (præputium) of a length of 4 mm., the inside of this with fine longitudinal folds, at its base the small glans. This last has the usual armature of (quincuncial) series of slightly yellowish hooks (fig. 15) rising to a height of 0·02 mm., the armature continued for a short distance up in the seminal duct. The spermatheca (fig. 16*a*) globular, of a diameter of 2–3 mm., greenish blue on account of its dark contents (of usual kind); the spermatocysta (fig. 16*b*) smaller, whitish, pear-shaped, containing zoosperms. The mucous and albuminous gland whitish and white; into the anterior end opened a thin-walled bag (vestibular gland?) (fig. 17) of the length of 4–5 mm. the inside of which showed closely set fine reticular folds.

The whole of the intestines was wrapt up in a loose, somewhat felt-like, colourless connective tissue, and the different parts of the intestines were connected by a similar substance.

The form here examined is certainly new; it approaches perhaps nearest to the *N. diaphana* of the Pacific Ocean (Aibukit).^{*} Regarding the salivary glands and the presence of a vestibular bag, it seems to differ from the hitherto known species of the genus.

EUPLOCAMUS, Phil.

Euplocamus, Phil., Enum. moll. Sic., i. 1836, p. 103.

Kaloplocamus, Bgh., Beitr. zu einer Monogr. d. Polyceraden, 1. Verh. d. k.k. zool. bot. Ges. in Wien, xxix., 1880, p. 623 (27).[†]

Euplocamus, Phil. R. Bergh, System d. nudibranch. Gasteropoden, 1892, *l.c.*, p. 1145.

Corpus nonnihil elongatum, vix depressum; margo frontalis sicut margo dorsalis appendicibus arborescentibus ornati; rhinophoria retractilia, clavo elongato perfoliato; branchia paucifoliata, foliolis tripinnatis; tentacula auriformia; podarium sat forte.

Lamellæ mandibulares validæ, e baculis minutis dense confertis compositæ. Radula latiuscula; rhachis nuda; pleuræ dentibus lateralibus majoribus hamatis quasi cochleariformibus tribus vel duobus et serie dentium externorum minorum, applanatorum breviori vel longiori (5–35).

Prostata magna, spermatothecam et spermatocystam amplectens; glans penis armata.

^{*} *L.c.* xi., 1877, pp. 454–457. taf. lv., figs. 15–16; taf. lvi., figs. 6–10.

[†] The generic name had been employed by Latreille (1809) for a Lepidopteron, somewhat later (1838) by Temminck for a fowl.

The frontal margin as well as the dorsal is provided with fine arborescent tufts, in the former more numerous, in the latter fewer in number. The retractile rhinophores with very perfoliate club. The gill composed of a few (5) tripinnate leaves. The tentacles ear-shaped; the foot rather well developed.

The strong mandibles formed of closely set fine staffs. The radula not narrow; the rhachis naked; the pleuræ with a few (3) strong hook-shaped lateral plates and a series of (5-35) rather flattened outer plates. The prostata large, embracing the two seminal bags; the glans armed.

The Euplocami form a transition link between the Polyceræ and the Plocamopheri, being more closely allied to the latter.

Only some few species are known, the validity of which even is not quite established:—

1. *E. croceus*, Phil.
M. Mediterr.
 Var. *Atlantica*, Bgh.
M. Atlantic.
 Var. *capensis*, Bgh.
M. Capense.
2. *E. japonicus*, Bgh.
M. Japon.
3. *E. pacificus*, Bgh.
M. Pacific.

E. CROCEUS, Phil., var. *CAPENSIS*.

Pl. XII., figs. 18-24.

Four specimens of this form were sent for examination, procured off Great Fish Lighthouse, off Cape Hangklip, and off Cape Point Lighthouse.

When alive they were of a "greenish colour with small red spots."

They closely resembled each other, and had a length of 30-35 mm. They are now of a whitish colour, but the best preserved and the largest of them showed the gill reddish yellow, so too the arborescences of the frontal and lateral appendages; moreover, small reddish yellow spots were sparsely scattered over the back and on the sides of the body. In all the specimens fine white points, sometimes a little prominent, appeared on the body, and, in all, the intestines shone blackish through the right side of the body.

Two individuals were dissected.

In the largest individual (35 mm. long) the diameter of the frontal veil with its arborescences was 25 mm., the height of these last rose

to 8 mm.; the breadth of the back between the lateral arbusculi was 13 mm., the height of these rose to 11; the height of the body proper 13 mm.; the height of the rhinophores was 10, the length of the gill-leaves 7 mm.; the breadth of the head with the tentacles 16 mm., of the tentacles themselves 5; the breadth of the foot in front 15, that of the brim 3, the tail 6 mm. long.

The form of the animal as in other *Euplocamis*; the strongly developed, rather large, somewhat curved frontal veil had in all the specimens 8 arborescences, of which the outermost was a little larger. The head rather broad with ear-like tentacles (fig. 18); in the largest individual the mouth tube was inverted and the bulbus pharyngeus projected to a length of 6 mm. The sheath of the rhinophores low, in one specimen the organs were nearly quite retracted; the stalk was a third of the height of the whole organ; the club with about 40 lamellæ and short end papilla. The back somewhat convex, smooth, sloping backwards; from the narrow brim projected, at somewhat equal intervals on either side, in all individuals, 4 strong arborescent appendages, the first near the rhinophore, the last at the root of the tail. They were of the usual form (fig. 19), mostly tripinnate, the branchlets mostly more or less pointed; the mostly somewhat lower frontal arborescent tufts of the same nature as the dorsal. The gill formed of 5 sometimes bifid tripinnate leaves, situated at about the last third of the length of the animal. The truncate anal papilla 1·5 mm. high; at its root to the right the fine renal pore. The sides of the body smooth; the genital papilla in one individual contracted, in the other the everted penis with its præputium projected 7 mm. (fig. 20), and from its point also the armature of the seminal duct to a length of 0·5 mm. (with a diameter of 0·12). The foot not narrower than the back; the anterior margin straight with a simple furrow; the tail with a slight crest with small arborescent tufts.

The *nervous system* nearly quite as formerly described* in the *Eupl. croceus*, Phil. The lamellæ of the club of the rhinophores had no calcified cells nor had their stalk, and in the skin of the back only few and small, never true spicules.

The mouth tube 4 mm. long, wide. The whitish *bulbus pharyngeus* 6·5–7 mm. long by a breadth of 5·5–6·5 and a height of 5·75, its form and structure quite agreeing with that of the *E. croceus*.† The yellow mandibular plates (fig. 21) 3 mm. long, somewhat longer than in the typical form, otherwise as in this, as also its structure; the diameter of its elements 0·005 mm.‡ The rather broad, some-

* Cf. *l.c.*, i., 1880, pp. 628–629. taf. xii., figs. 10, 11; taf. xiii., fig. 3.

† Cf. *l.c.*, pp. 630–631.

‡ Cf. *l.c.*, p. 630.

what depressed, whitish *tongue* with a deep cleft for the yellowish or yellow radula (as far as could be determined by the nearly cartilaginous state of hardening of the bulbus); the rasp contained about 17 rows of plates, in the sheath moreover about 13, the total number of rows being thus about 30. On each side of the rather broad naked rhachis 3 strong lateral plates and a series of outer plates. The plates were yellowish; the length of the first lateral plate was (in a straight line) 0·40 mm., that of the first of the outer plates 0·20, of the last mostly 0·10 mm. The three lateral plates (fig. 22) as in the typical species,* as also the outer ones (fig. 22*a*), whose number rose to at least 22.

The *salivary glands* (12–13 mm.) long, rather thin, somewhat uneven, yellowish white, running along the œsophagus to the anterior end of the liver.

The *œsophagus* 5 mm. long. The stomach 8–9 mm. long by a diameter of 4–5, entering a little to the left in the cleft on the under side of the anterior end of the liver. The *intestine* under the gill rising to the surface somewhat to the left in the deep furrow of the liver, running forwards along the left side of the liver, with its bend overlying the stomach and anterior genital mass, and running backwards to the anal papilla; the length of the intestine 4–4·5 cm., the diameter 2·5–4 mm. The contents of the alimentary tract, especially of the intestine, blackish, consisting chiefly of pieces of different Bryozoa, fine sand particles and different spicula.

The posterior visceral mass (*liver*) 16–18 mm. long by a height and breadth of 11, yellowish, rounded behind; with a rather deep cavity on the right side of the anterior end for the pylorus and the anterior genital mass, and an oblique transverse furrow on the upper side from the region of the gill. The substance of the liver yellow, contrasting with the enveloping whitish hermaphrodite gland; the cavity small. No gall-bladder could be seen.

The pericardium, the blood gland, the kidney, and the pericardio-renal organ as formerly described.†

The whitish hermaphrodite gland forms a rather (2–2·5 mm.) thick layer; in its lobules ripe genital elements. The hermaphrodite duct with its ampulla as formerly described.‡ The *anterior genital mass* large, angularly rounded, of a diameter (in the two individuals) of 9–12 mm., whitish. The largest part of this is formed by the large *prostata* (with the spermatheca); this mass is short and pear-shaped, 8–9 mm. long by a diameter of 3·5 and 6; the gland quite envelops the spermatheca, only leaving its neck free. The spermatheca pear-shaped, 7 and 7·5 mm. long by diameter of 3 and 5;

* Cf. *l.c.*, p. 632. † Cf. *l.c.*, 1880, p. 634. ‡ Cf. *l.c.*, 1880, p. 635.

the small spermatocysta also pear-shaped, of a length of 2·5–3 mm., in both individuals lying quite free at the neck of the spermatheca. From the prostata issues the sperm duct, whose prostatic part forms a little bundle of windings and then passes into the strong muscular part; this last has a length of 2·75–3 cm., and was continued as the somewhat thicker *penis* of a length of 2·25–3 mm. The glans was in the two individuals quite everted (fig. 20), in one drawn back in the sheath (præputium) (fig. 23); the anterior part (about 2 mm.) of the seminal duct showed on its inside out to its mouth on the glans (fig. 23) a clothing with rows of hooks; the diameter of this clothed part was then 0·08 mm., and the end of it was (as often in the Polyceridæ) (fig. 23) everted. The hooks were colourless, of usual form, of a height up to 0·02 mm. (fig. 24). The albumino-mucous gland as usual.

The differences in outer form and anatomical structure from the typical species does not seem to me to be of sufficient value to justify the establishment of a new species. I regard the form examined as a variety of the *E. croceus* of the Mediterranean (and perhaps of the Atlantic) Sea.

An additional specimen captured off the Tugela River mouth showed some differences in its habitus, but certainly belonged to the same species.

This specimen had a length of 20 mm. by a breadth of the back proper of 6 and a height of 7 mm. The frontal veil showed 6 arborescences, and the back on either side 5 arbuscular appendages; the gill had the usual 5 leaves.

The whitish bulbus pharyngeus 3·5 mm. long by a height and a breadth of 3; the yellow mandibular plates as above. On the tongue 13 series of tooth-plates; in the rasp-sheath 9, the total number of series being thus 22; the plates as above, the number of outer plates as much as 18. The length of the first lateral plate was nearly 0·40 mm., that of the third 0·35; that of the outermost of outer plates 0·075–0·10–0·12, that of the innermost 0·16 mm.

The penis projected just as above.

KALINGA, Ald. et Hanc.

Alder and Hancock, Notice of a Coll. of Nudibr. Moll. Trans. Zool. Soc., v., 3, 1864, pp. 134–136, pl. xxxii., figs. 7–10.

R. Bergh, Malacolog. Unders., iii. (Heft xvii.). 1890, pp. 959–962. taf. lxxxviii., figs. 19–20; taf. lxxxix., figs. 46–47.

Corpus ovale, postice rotundatum, brevicaudatum; limbus fron-

talis sat angustus, digitatus, digitis papilligeris; margo dorsalis digitis similibus sed majoribus, parvis ornatus; rhinophoria retractilia, clavo perfoliato; branchia paucifoliata, e foliis magnis, omnino discretis, in orbem dispositis, tri- vel quadripinnatis composita; tentacula a lateribus disci oralis auriculatim soluta; podarium magnum, dorso latius.

Armatura labialis nulla. Radula seriebus confertis numerosis e dentibus uniformibus minutissimis et numerosissimis formata.

Prostata magna. Glans penis aculeis armata.

Body rather clumsy, oval, subangular, rounded behind; the back somewhat narrower than the foot, the frontal margin with a row of closely set papillated processes, the lateral with a few similar but larger appendages; the perfoliated rhinophores retractile within sheaths; the (oral) tentacles short, flattened; the branchia (non-retractile) formed of few (5) quadripinnate, large plumes, each standing separately (as in *Hexabanchus*) surrounding the vent. The foot very strong, larger than the back, and, like it, on the back covered with tubercles.

The lip disc clothed by a simple cuticle, without particular armature. The rasp shows many closely set series of tooth-plates, the number of plates in the series very great; the plates uniform, very small and with tricuspid hook.*

A large prostatic gland exists. The glans penis armed with thorns.

Only one species of the genus is hitherto known.

KALINGA ORNATA, A. et H.

Alder and Hancock, *l.c.*, 1864. pl. xxxii., figs. 7-10.

R. Bergh, *l.c.*, 1890, pp. 959-962.

Pl. XIII., figs. 1-5.

Two large specimens were captured off Amatikulu Conical Hill by shrimp-trawl; both were dissected. When alive the colour of the animals was a "light flesh or light brown."

The length of the individuals was 7.5 and 9.5 cm. by a breadth of 4.5 and 6 and a height of 2.5 and 2.7 cm.; the breadth of the back proper was 3.2 and 3.8 cm., its brim projected 7 mm., and the height of the (5) larger marginal papillæ reached up to 15 and 17 mm.; the length of the gill-leaves was 15-20 mm., the anal papilla projected 5 mm.; the height of the rhinophores 7 mm.; the breadth of

* The specimen formerly examined by me had been taken by angling, and the anterior viscera were torn out,

the head disc with the tentacles 3 and 2 cm. by a height of 1 and 0.5.

The ground *colour* of the back seemed to be grayish white, but the tubercles and cones whiter with mostly crimson top; the margin of the rhinophore sheaths crimson, the club of these organs reddish with crimson tip; the larger marginal and (2) posterior papillæ, as well as some of the smaller, crimson coloured, sometimes with yellowish tip; the rhachides of the gill-leaves and their ends of the same colour; the margin of the anal papilla crimson. The whole of the under side of the body grayish white; but the sides of the body (foot) as well as the tail showed here and there the tips of the tubercles crimson coloured. The consistence of the animal somewhat coriaceous, but still rather soft.

The posterior part somewhat convex, covered all over with rather closely set, soft papillæ or tubercles of roundish form and very different size, reaching a diameter of 4 mm. and sometimes of the same height, they very often rise in a central (contractile) pointed cone (fig. 1); the sides of the body (foot) and the tail are covered with similar tubercles, but the cones are less pronounced. The anterior convex margin of the back with about 12 whitish, unequal, somewhat branched and papillated appendages, between which there are here and there small cones; this row ends on either side with a somewhat larger papilla of crimson colour; the under side of this frontal brim even. The lateral brim of the back bears at irregular intervals 5 larger conical appendages covered all over with small papillæ; behind the gill, at the end of the back proper, two similar appendages. The brim of the rhinophore-sheath carries a row of small papillated appendages; the strong club with about 30 thin lamellæ on either side. The diameter of the whole somewhat flattened gill was greater than that of the back; every one of the (5) gill trees consisting of (4-) 5 diverging tripinnate or quadripinnate leaves. In the middle of the interbranchial area the truncate anal papilla (standing about at the limit of the second and last third of the back), and at its base to the right the renal pore. The head disc rather broad, somewhat semilunar; the mouth perpendicular; the free auricular parts of the tentacles short. In front at the base of the marginal brim of the back the genital papilla. The foot large, with a marginal transverse furrow in front, the border everywhere with small arborescent appendices.

The walls of the cavity of the body very thick.

The *central nervous system* of a breadth of 4.5 mm., whitish, wrapt up in a covering of closely attached connective tissue; the different ganglia could not easily be separated; the nerve-cells of a

diameter up to 0.25 mm.; gastro-œsophageal ganglia were wanting as in the allied genera, (*Nembrotha*) *Euplocamus* and *Plocamopherus*.

The nearly sessile eyes of a diameter of 0.12 mm.; the otocysts a little larger. In the lamellæ of the club of the rhinophores no spicula, which were almost absent in the skin (as in allied genera).

The whitish mouth tube 8 mm. long, its inside more grayish. The strong *bulbus pharyngeus* whitish, red or crimson on the outside and inside of the palate, the pharyngeal region and the cheeks and roof of the rasp-sheath (tectum radulæ); the length 17 and 22 mm. by a height of 13 and 26 and a breadth of 15 and 22 mm.; the lip disc and partly the inner mouth clothed with a whitish, downwards grayish cuticle; on the hinder end of the bulb projected the rounded head of the two lingual masses, and between and before them the short and not large rasp-sheath plunges. Against the white tongue contrasted the brownish gray rasp; that on the upper side (and quite in the same way in both specimens) appeared (fig. 2) as a rather broad wall; the length of this part was in the largest specimen 16 mm. by a breadth of 8, the anterior end was for a length of 10 mm. continued at the under side of the tongue; the hindermost part of the rasp was sunk in a valley and then backwards and downwards continued in the rasp-sheath. This last (15 mm. long) was a gray, rather thick-walled, compressed, longitudinally wrinkled bag, whose cavity showed the close set series of tooth-plates. The rhachidial part of the rasp seemed not quite narrow. The number of series of plates in the radula more than 100, and that of plates in the series scarcely less than a couple of hundreds. The series were for a great part rubbed off. The tooth-plates (figs. 3, 4) yellowish, uniform, small, the length of the body about 0.08 mm., the height of the hook about 0.075; the hook with two larger and a smaller lateral denticle.* Some few of the hinder series in the rasp-sheath were not fully developed. The state of conservation did not permit a more detailed examination.

The salivary glands about 3 cm. long, in their first fourth of a diameter of 2 mm., elsewhere thinner.

The *œsophagus* of crimson colour, contrasting against the grayish stomach, 15 and 17 mm. long by diameter of 10–15, marked off from the stomach by a slight constriction. The *stomach* broader in front, 18 and 26 mm. long by diameter of 13 and 11, entering in the transverse furrow of the liver to the right. On the inside of the *œsophagus* and the stomach fine longitudinal folds; the cavity empty. The *intestine* appears in the neighbourhood of the pylorus, runs to the

* Alder and Hancock (*l.c.*, p. 134) mention the tricuspid character of the tooth-plates.

left through the transverse and link furrow of the liver, then forwards, forming a bend on the upper side of the anterior genital mass, then runs backwards to the anal papilla; the length of the intestine 6 and 10 cm. by diameter of 7 and (3-) 5 mm.; the yellowish gray and blackish contents of the intestine were more or less crumbled animal substances filled with spicules, perhaps of *Holothuriæ*. The posterior visceral mass (*liver*) on the surface yellowish white, 3 and 3.5 cm. long by a breadth of 1.7 and 2.3 and a height of 1.3 and 2 cm.; the mass was rounded behind and before, the anterior half a little lower; a transverse furrow divides the mass on its upper side into two parts of nearly equal size; it is continued along the left side to the anterior end; the substance of the liver dirty yellow; the cavity rather small.

The *pericardium* large, 28 mm. broad by a length of 22; the ventricle of the heart 11 mm. long by a breadth of 9. The blood gland whitish, thin, of oval form, 17 mm. long by a breadth of 9, lying to the right within the genuflexion of the intestine. The *reno-pericardial* organ whitish, flattened, 4 mm. broad; its duct 20 mm. long.

The *hermaphrodite gland* nearly clothing the whole liver with a whitish layer 2-4 mm. thick; in its lobules ripe sexual elements. The *anterior genital mass* (in the larger individual) 2.8 cm. long by a height of 2.2 and a breadth of 1.5; the efferent ducts moreover projecting 1 cm. The hermaphroditic duct forming a longish bunch of coils on the left side of the hindermost part of the genital mass. The spermatheca is a long grayish pyriform bag of the length of 2 cm. by a diameter of 1; the vaginal duct about 4 cm. long, the vagina somewhat wider; the uterine duct 16 mm. long; somewhat about its middle hangs the small pyriform spermatocyst of a length of 4 mm., its duct about twice as long as the organ itself. The muscular first part of the seminal duct short, passing into the white, compressed prostatic part, that projects in a stronger, short continuation, ending in a strong, nearly globular ampulla of a length of 10 mm. by a diameter of 8; the continuation forwards nearly 2 cm. long. In the last lies the *glans penis*; its anterior end is somewhat leaf-like, it is entirely covered with yellow pointed thorns (fig. 5) of a length up to 0.12 mm.; irregular forms are rather often seen. The muco-albuminous gland very large, yellowish white and white. In the vestibulum opens a brownish, rounded gland 7 mm. in diameter.*

* The state of conservation of the anterior genital mass was not good.

The condition of the vas deferens was as formerly represented by me (Cf. *l.c.*, taf. lxxxiv., figs. 46-47).

The smaller individual showed the whole genital apparatus less developed; on the glans penis no armature could be detected.

DOR. PHANEROBR. NON SUCTORIÆ S. GONIODORIDIDÆ.

R. Bergh, *System, l.c.*, 1892, pp. 1147–1157.

IDALIA, F. S. Leuckart.

F. S. Leuckart, *Br. animal. quor. descript.* 1828, p. 15, fig. 2*ab*.

R. Bergh, *Üb. die Gatt. Idalia*, Leuck. *Arch. f. Naturg.* xlvii, 1, 1881, pp. 140–181; taf. vi–viii.—*System d. Nudibr. Gasterop., l.c.*, 1892, pp. 1155–1156.

Forma corporis sat alta. Notæum proprium sat applanatum cirrhis paucis seriatis vel omnino læve, margine prominente cirrigero. Rhinophoria juxta-marginalia non retractilia. Branchia postica, e foliis simpliciter pinnatis, in arcum dispositis formata. Podarium sat latum, cauda applanata continuatum.

Discus labialis annulo angusto hamulorum seriatim dispositorum armatus vel utrinque lamina mandibulari elementis similibus formata. Radula angusta; rhachide nuda, pleuris dente majori hamiformi et externo lamelliformi instructis.—Ingluvies buccalis fortis, fere sessilis.

Prostata magna; glans penis hamulis armata.

The form of the *Idaliæ* is somewhat distinctive, not depressed. The rather flat back proper shows some cirrhi set in series or is quite smooth; the margin projecting, somewhat turned up and furnished with a series of cirrhi. The rhinophores stand apart from each other anteriorly, not retractile, with perfoliated club. The gill standing rather backwards, consisting of simple pinnate leaves quite distinct from one another, set in the form of an arch. The foot is rather large, continued in a short tail.—The bulbus pharyngeus with a strong suctorial crop; the lip disc of the bulbus proper provided with an armature of densely set small hooks or with mandibular plates. The radula is narrow; the rhachis narrow, naked; the pleuræ contain a very large compressed upright lateral plate with plain or finely denticulated hook, and an outer small lamelliform plate.—The prostata is rather large; the glans penis armed with hooks.

The genus is divided into two subgenera:

1. *IDALIA* (proprie).

Notæum medium cirrhigerum. Discus labialis annulo hamigero instructus.

1. *Id. elegans*, Leuck.

M. Atlantic., Mediterraneum.

2. *Id. Leachii*, Ald. et Hanc.
M. Atlantic., Mediterraneum.
3. *Id. Mediterranea*, Jher.
M. Mediterraneum.
4. *Id. tentaculata*, Stimpson.
M. Chinense.

2. *IDALIELLA*, Bgh.

R. Bergh, *l.c.*, 1881, p. 145.

Notæum medium læve. Discus labialis lamellis mandibularibus instructus.

1. *Id. aspersa*, A. et H.
M. Atlantic.
2. *Id. pulchella*, A. et H.
M. Atlantic.
3. *Id. inæqualis*, Forb. et Hanley.
M. Atlant.
4. *Id. amœnula*, B.
M. capense.

IDALIELLA AMŒNULA, Bgh. n. sp.

Color generalis animalis lacteus, notæum (anterius) linea mediana et laterali coccinea ornatum, rhinophoria flavescentia, cirrhi apice e flavo rubri; branchia et area branchialis coccineæ; latera corporis superne linea coccinea ornata; dorsum caudæ linea mediana coccinea.

Pl. XIII., figs. 6–11.

Of this beautiful form 5 specimens were sent, procured at rocks, Gordon's Bay.

Two individuals were dissected. The colour of the living animal was "pink."

The length of the animals was 8–13 mm. In the largest the breadth of the back proper was 5, the height 4·5 mm.; the height of the rhinophores 2, of the cirrhi 3 mm., the diameter of the gill 4, the foot 4 mm. broad, the tail 1 mm. long.—The ground colour was milk-white, on the anterior part of the back a rather thin median crimson line and another on each side of the back proper, somewhat broader and more irregular, all three lines uniting in front; the rhinophores yellowish; the upper third or sometimes half of the cirrhi reddish yellow; the area branchialis and the gill-leaves of crimson colour; along the upper part of the sides of the body a more or less interrupted line of similar colour, along the back of the tail a median line of the same nature.

The form as in other *Idaliæ* (fig. 6). The tentacles rather large, lobe-like; the rhinophores strong, not retractile, situated on the sides of the neck proper. The back with weak median crest, otherwise quite even; its prominent brim somewhat turned up, disappearing behind, and the back passing in the tail. The frontal brim carries 4, seldom 6 cirrhi, the lateral 8, but the hindermost always coalescent; the cirrhi pointed, finger-shaped, of nearly equal size, quite even; the brim quite even between the digitations. Behind the middle of the back stands the gill, consisting of 12, seldom 11, simple-pinnate, not large leaves, set in a wide arch (fig. 6), the hindermost somewhat smaller; the anal nipple a little behind the median leaf, at its base the renal pore. The sides of the body even. The foot nearly as broad as the back, its brim not narrow; the tail short.

The intestines shone grayish through the sides and through the foot.

The central nervous system seemed to be as in *Id. elegans* formerly described by me (*l.c.*, pp. 153–156).—The number of lamellæ in the club of the rhinophores did not seem to be large. The skin (of the back) scantily provided with spicules, which were looser, hardened and crumbling, yellowish.

The whitish *bulbus pharyngeus* small, 2–2·75 mm. long; more than the half of it belongs to the (suctorial) crop, that covers the whole of the bulb proper, is somewhat embedded in its upper wall, not connected with it by a short stalk, but opening in it through a slit. This crop (fig. 7) is of the usual structure. On the bulbus proper the rasp-sheath projects a little behind; the lip disc is provided with mandibular plates of a breadth up to 0·25 mm., the height of their elements (fig. 8) reaching 0·013 mm.—The *tongue* rather well developed; the narrow rasp nearly colourless, with erect tooth-plates (fig. 9). These last colourless; the height of the lateral plates 0·25, of the outer ones 0·08 mm. The number of rows of plates on the tongue 22–24, in the sheath 10–11, the total number of rows being thus 32–35. The lateral plates (figs. 9, 10a) of the form as in other *Idaliæ*, but the hook finely serrated. The outer plates (fig. 10b) also of the ordinary form.

The salivary glands (fig. 7aa) whitish, about as long as the bulbus pharyngeus.

The posterior visceral mass 8 mm. long by a diameter of 4; its posterior end rounded, the anterior with long and deep impression on the right and under side by the anterior genital mass. The mass shows only the hinder end of the brownish gray or grayish brown *liver* naked; this is elsewhere, on the whole of the upper side,

covered by the very thick layer of the whitish hermaphrodite gland.

The *hermaphrodite gland* showed ripe genital elements in its lobes. The *anterior genital mass* in one of the two individuals 3, in the other 6 mm. long, rounded quadrangular in circumference, plano-convex, whitish and white. As far as could be determined by the hardened state of the organ, the relations of the prostata and the seminal bags were as in the typical species. The muscular part of the seminal duct not short, passing gradually into the somewhat thicker, whitish penis of a length of about 1 mm. The glans armed in the usual way with hooks, this armature for a short distance continued up into the seminal duct, and in one individual the anterior end of the armature freely projecting from the glans (fig. 11) for a length of 0.28 mm. and with a diameter of 0.06; the height of the small hooks hardly exceeding 0.0055 mm.

NUDIBRANCHIATA KLADOHEPATICA.

R. Bergh, *System, l.c.*, 1892, pp. 999–1070.

FAM. TRITONIIDÆ.

R. Bergh, *System der Nudibranchiaten Gasteropoden*, 1892, pp. 1066–1070.

The family contains the typical *Tritoniæ* of Cuvier and the *Marioniæ* of Vayssière, the *Tritoniopsis* of Eliot,* moreover the *Atthilidæ*† with perfoliated rhinophores, which character otherwise is not seen in the *Tritoniidæ*, and now the *Tritonidoxæ*, different from all other *Tritoniidæ* by the absence of gills on the sides of the back.

* Eliot, "The Nudibranchiata of the Antarctic Expedition." *Trans. of the Royal Soc. of Edinburgh.*, xli., 3, 1905. pp. 530–532, figs. 17–20.

The description of the rhinophores is rather unintelligible.

† R. Bergh, "Nudibranchiate Gasteropoder. ii. Den Danske Ingolf-Expédition," ii., 3, 1899. pp. 21–24; tab. iii., figs. 10–26.

TRITONIA, Cuv.

R. Bergh, System, *l.c.*, p. 1068.

1. TRITONIA PALLIDA, Stimpson.

Stimpson, Descr. of some new Marine Invertebrata. Proc. of the Ac. of Nat. Sc. of Philadelphia, vii., 1856, p. 388.

Eliot, the Nudibranchiata of the Antarctic Expedition. Trans. Roy. Soc. of Edinburgh, xli., 3, 1905. p. 528, figs. 11-54

Pl. XIII., figs. 12-15 ; Taf. XIV., fig. 1.

One specimen of this form was procured in False Bay (Buffalo Bay) by shrimp-trawl. It is now very hard and stiff, not very suitable for anatomical examination.

The length of the animal is 5 cm. by a breadth of the back proper of 1·5 and a height of 1·2 cm. ; the breadth of the frontal veil 11 mm., the height of the rhinophore sheaths 3 mm., that of the gills 4 mm. ; the breadth of the foot in front 13 mm., its brim 3, the length of the tail 7 mm. The animal is now uniformly coloured white.*

The form is as usual, elongated, subquadrilateral ; the frontal veil somewhat bilobed, with 4 digitations on either lobe (as also remarked by Stimpson), the outermost one being the usual spoon-like tentacle ; the sheaths of the rhinophores erect, tubular, with digitate margin, the club as far as could be detected of the usual sword-knot form. The back all over somewhat nodular, flattened ; the margin a little projecting, rising in about 12-14 gills of the usual kind and somewhat varying size (according to Stimpson there are 16 gills and between those smaller ones). The genital opening as usual ; the anus at about the middle of the body proper, under the sixth gill. The foot with a rather long slight marginal furrow, the brim not quite narrow ; the tail rather long.

The intestines were nowhere to be seen from without.

The whitish central nervous system as usual ; the nerve cells reaching a diameter up to 0·28 mm.

The strong *bulbus pharyngeus* 14 mm. long by a breadth of 8 and a height of 7·5 ; its form and structure as usual. The yellow mandibles rather elongated, 14 mm. long by a breadth of 4 and a

* The specimen captured by Stimpson in False Bay, Cape, was when alive "1 inch long, of transparent white colour with a few flake-white spots on the back—the filaments around the truncated extremity of the sheaths of the tentacles of a dark brownish colour ; a white line extends below and parallel to the branchiæ on the sides of the body."

convexity of 2·5; the length of the hinge 2 mm. (fig. 12); the masticatory edge not broad with some small and usually 4–5 series of clumsy denticles (fig. 13), reaching a height of 0·16 mm., the masticatory process rather short (fig. 12a). The *tongue* large, as usual, quite hardened, so that neither the number of rows of plates in the colourless radula nor in the sheath could be determined; the number of plates also in the rows could not be ascertained; it seemed to be rather considerable. The median as well as the first lateral plates yellowish, the rest colourless; the median plates of a breadth of 0·28 mm., the length of the first lateral 0·26, the height of the lateral rising to 0·28 mm. The median plates (fig. 1) of the usual form, as well as the first lateral (fig. 1) and as the following (fig. 14); towards the margin of the rasp the plates were sometimes of different form (fig. 15).

The salivary glands as usual. The œsophagus posteriorly dilated into a kind of stomach of a length of 8 mm. by a diameter of 4; the intestine as usual. The alimentary tract quite empty. The posterior visceral mass (*liver*) 2·5 cm. long by a diameter of 1, conical, the anterior end obliquely truncate (for the anterior genital mass); its substance grayish, covered nearly all over by the thick layer of yellow hermaphrodite lobes.

In these last were ripe genital elements. The *anterior genital mass* somewhat globular, 10 mm. long by 7 in diameter; the very strong ampulla of the hermaphrodite duct with its two coils constituting at least a fourth part of the whole mass; the seminal vesicle longish (5·5 mm. long); the albumino-mucous gland yellowish and whitish.

The form here examined is very probably the *Trit. pallida* of Stimpson.

A smaller individual was procured by dredge at Cape Morgan, another by shrimp-trawl off Great Fish Point Lighthouse.

They were 18–21 mm. long by a breadth and a height of the body proper of 5–6; the height of the gills reached 2·5–3 mm. The colour was (yellowish) white, along the side of the body (as mentioned by Stimpson) ran a thin white line. On the right side the intestine shone grayish through and behind the yellowish white hermaphrodite gland. The frontal veil showed all in all 10 digitations, and the margin of body 10–15 on each side.

The markedly whitish bulbus pharyngeus 5·9 mm. long. The yellow mandibles quite as above. The radula colourless, containing 33 series of plates, in the sheath 13, the total number of rows thus being 46. On each side of the median plates 32 lateral. The plates colourless, the breadth of the median 0·14 mm.

At a later date two specimens were procured off Constable Hill (NNE. $6\frac{1}{2}$ miles) by large trawl from green mud and a depth of 33 fms. The living animal showed the "back of light flesh colour." One specimen was small, only 2.3 cm. long, but otherwise in respect to the frontal veil, the gills and even the everted glans penis entirely agreeing with the larger, which was more closely examined.

This last was 4.5 cm. long by a breadth of 1.8 and a height, with the gills, of 1.1; the breadth of the frontal veil 11 mm., the height of the sheath of the rhinophores 2 and of the club 3 mm., the height of the gills reaching up to 6 mm.; the breadth of the foot 14 mm.

The series of gills commenced with a small one, then followed 12-13 larger and finally came 5 small. The frontal veil on each side with 4 small fingers. The back quite even. The pointed conical glans penis projected straight out 5 mm.

The *bulbus pharyngeus* 13 mm. long by a height of 7 and a breadth of 8; the mandibles quite as above, the masticatory edge with some few (3-5) smaller and about 5 stronger series of flattened denticles. The cavity of the mouth colourless. The colourless rasp of the *tongue* seemed to contain 23 series of plates; the number of the lateral plates could not be determined. The plates as above; the breadth of the median 0.35 mm.

2. TRITONIA INDECORA, Bgh. n. sp.

Pl. XIII., fig. 16; Pl. XIV., figs. 2-3.

Two individuals were procured off Cape Point by a shrimp-trawl. They were rather hardened and in a fair state of preservation; the largest was, as far as possible, examined anatomically.

The specimens had a length of 30-35 mm. The breadth of the back was in the largest 11 and the height also 11.

The colour was whitish all over. When alive, they were of a "pinkish colour."

The form was as usual; the narrow frontal veil with a slight median emargination, each side of which was provided with 11-12 pointed finger-like processes, the outermost slightly spoon-shaped. The rhinophores seemed of the usual kind; their sheath somewhat crenulated with a stronger outer lobe. The back quite even, the margin slightly projecting, rising (in the two individuals) on each side in 5-8 rather low arborescences (of a height up to about 3 mm.); between these here and there were some much smaller ones. The foot as above.

The intestines nowhere shining through.

The *central nervous system* yellowish red; the cerebro-pleural ganglia roundish, a little larger than the rounded pedal ganglia; the cerebro- and pleuro-pedal connectives short; the double chief commissure rather wide. The optic nerve long, the eye of 0.14 mm. diameter; the otocyst measuring about 0.10 in diameter.

The *bulbus pharyngeus* whitish, only the palate and the pharynx being black; the length was 10 by a breadth of 7 and a height of 6 mm. The bright yellow mandibles 10 mm. long, together measuring in breadth 6 mm., and one only 3 mm.; the form about as in the other species, but the hinge a little larger, about 2.25 mm. long; the masticatory edge a little broader, with 5 rows of projecting denticles of a height up to 0.10 mm. The *tongue* whitish with yellow rasp, which behind at the tectum radulæ had a breadth of 6 mm.; the rasp contained 26 series of teeth, the sheath 13, the total number being thus 39; the rows had, on each side of the median plate up to 60 lateral. The plates were yellow; the breadth of the median was 0.25 mm., the length of the first lateral 0.18, the height of the lateral rising to 0.30 mm. The median plates (fig. 2) resembling those of the former species, but with the hook always rounded; the lateral plates (fig. 16, 3) as above.

The long, white, rather thin salivary glands as usual. The stomach-like œsophagus 8 mm. long by a diameter of 5, whitish and contrasting with the black pharynx; the intestine making a large arch, 13 mm. long. The contents of the digestive tract were a red mass of sponge, full of red spicules of a length up to 9 mm.

The posterior visceral mass, 16 mm. long by a diameter of 8, pointed behind, obliquely truncate before, with a large excavation for the œsophagus and anterior genital mass. The *liver* brownish gray, but nearly quite covered by the thick yellowish layer of the large lobes of the hermaphrodite gland.

In the lobules of the hermaphrodite gland ripe genital elements. The *anterior genital mass* triangular-rounded of a diameter of 7 mm., white, the ampulla of the hermaphrodite duct grayish; the coils of the sperm duct measured when stretched out 2 cm.; the seminal vesicle globular, of a diameter of 2 mm.

The nature of the frontal veil and of the gills, the colour of the palate and pharynx and the form of the median tooth-plates seem to justify the establishment of a new species.

TRITONIDOKA, Bgh. nov. gen.

Forma corporis ut in Tritoniis, ita quoque velum frontale marginine breve-digitato tentaculis cochleariformibus sicut rhinophoria. Notæum læve limbo sat sato, sine branchiis.

Bulbus pharyngeus ut in *Tritoniis*, ita mandibulæ cum processu masticatorio, et ita radula.

This genus* differs from the other generic types chiefly in the *total want of branchiæ* on the sides of the back. Otherwise the group agrees almost entirely with the other *Tritoniæ* in the form of the body, the frontal veil with its peculiar tentacles, and the sword-knot-rhinophores. It has, too, the same form of the *bulbus pharyngeus* with its mandibles and of the armature of the tongue.

TRITONIDOXA CAPENSIS, B. n. sp.

Pl. VIII., figs. 8-13.

One specimen of this form was taken by dredge off Glendower Beacon from a depth of 66 fms.; the bottom was broken shells and stones.

It was 3.2 cm. long by a breadth of 1.5 and a height up to 1 cm.; the breadth of the frontal (tentacular) veil was 11 mm., the height of the rhinophores 6, the breadth of the brim of the back 6 mm.; the breadth of the foot 11 mm., of its brim 3. It was of a uniform white colour.

The form of the animal, as in other *Tritoniidæ*, somewhat pointed towards the hinder end. The frontal veil (fig. 8) not much projecting, quite even, at the margin with 2-3 short finger-shaped processes on each side besides the tentacular. The margin of the rhinophore cavities somewhat prominent, even; the stalk of the rhinophores as high as the swordknot-like club. The back entirely even, its brim rather broad, very undulating, also quite even on the under side. The sides of the body rather low; from the genital opening the glans of the penis projected (very curved) for a length of 2.5 cm.; the small anal papilla at the base of the brim of the back behind the middle of the length of the body. The foot rounded in front, with a slight marginal furrow; the brim not narrow. On the left side an intestine shone grayish through.

The cavity of the body ending 14 mm. from its end.

The central nervous system as in other *Tritoniidæ*, the cerebro-pleural ganglia not quite as large as the pedal.

The white *bulbus pharyngeus* of typical form, 8 mm. long by a breadth of 6 and a height of 5 mm.; the muscular plate on the fore side of the mandibles was as usual. The *mandibles* measured in a straight line 6 mm.; they were yellowish, only the masticatory edge being brownish yellow; their form was as usual, but rather

* Δόξα, presumption, conjecture.

narrow and the hinder end more pointed (fig. 9); the masticatory edge about 0.14 mm. high, showing about 5-6 series of cones, whose point projected about 0.025 mm. (fig. 10). The *tongue* as usual, strong, the rasp nearly colourless, tapering anteriorly, containing 31 series of plates, in the sheath moreover 34, of which the three hindermost were not quite developed, the total number of series being thus 65. The number of lateral plates on each side of the median seemed to rise to 75. The median plates bright yellow, the lateral colourless; the breadth of the median 0.16 mm., the height of the lateral up to 0.16, that of the outermost 0.12. The median plates of the form common in the Tritoniidæ, but rather broad, with a clumsy short median hook and two similar a little smaller (fig. 11). The first lateral plate also typical, different from the rest (fig. 11); these were of the common hook form, but slender (fig. 12), the innermost more clumsy (fig. 11).

The whitish salivary glands as usual.

The œsophagus short, about 3 mm. long. The stomach partly lying on the left side of the liver, somewhat constricted in the middle, 9 mm. long by a breadth up to 4.5, empty; the longitudinal folds of the anterior part much stronger than those of the posterior. The intestine issuing from the stomach near its end, ending near the end of the liver.

The *liver* brownish yellow, conical, 11 mm. long by a breadth in front of 5; the anterior part was partly isolated from the rest by a deep cleft entering from the right side and a smaller one interpolated between the pylorus and the intestine.

The large lobes of the yellowish white *hermaphrodite gland* were spread over the upper side of the liver, and contained ripe genital elements. The rather thick yellowish coils of the hermaphrodite duct lay on the inside of the *anterior genital mass*. This last somewhat pear-shaped, 7 mm. long, white. The seminal vesicle globular, of a diameter of 2 mm.; the vaginal duct 2 cm. long. The *præputium penis* thin, reverted; the glans very long (3 cm.), its greater part (2.5 cm.) freely projecting, cylindrical, with pointed end (fig. 13); the seminal duct opened at its end.

ÆOLIDIIDÆ.

R. Bergh, System, *l.c.*, pp. 1002-1039.

JANIDÆ.

R. Bergh, System, *l.c.*, pp. 1036-1037.

Corpus nonnihil depressum, margo dorsalis papilligerus, bursæ

cnidogenæ nullæ; anus ut plurimum dorsalis, posticus medianus; rhinophoria ut plurimum perfoliata, tentacula brevia; margo anterior podarii angulis vix prominentibus.

Mandibulæ fortissimæ, margo masticatorius applanatus, aut edentulus aut denticulis crassioribus armatus. Radula ut plurimum lata et multiseriata; dentes, mediani sicut laterales, elongati hamati non denticulati.

Penis inermis.

The Janidæ form a very distinct group. The anus lies mostly dorsal, far backwards and median. But their most essential character is the possession of colossal mandibles, the flat masticatory edge of which is even or bears very strong denticles. The lingual teeth, median as well as lateral, are elongate, never denticulate.

The family contains a few genera, mostly very distinct.

I. JANUS, Verany.

R. Bergh., Beitr., 1. l.c., xxiii., 1874, pp. 597-605; vii., l.c., xxxii., 1882, pp. 64-66.

Vayssière, l.c., 1888, pp. 29-32.

Rhinophoria perfoliata, crista interrhinophorialis; anus dorsalis.

Margo masticatorius latus dentatus. Radula multiseriata.

1. *J. cristatus* (delle Chiaje).
M. Atlantic., Mediterr.
2. *J. ? sanguineus*, Angas.
M. Pacific.

II. JANOLUS, Bgh.

R. Bergh, Rep. on the Nudibr., l.c., 1884, pp. 18-23.—Malacolog. Unters., vi., 1. 1904, p. 6.

Rhinophoria perfoliata, crista interrhinophorialis; anus dorsalis.

Margo masticatorius latus non dentatus. Radula multiseriata.

1. *J. hyalinus* (A. et H.), B.
M. Atlantic.
2. *J. Australis*, B.
M. Pacificum.
3. *J. cæruleo-pictus*, Cockerell et Eliot.*
M. Californ.
4. *J. Capensis*, B. n. sp.
M. Capense.

* "Notes on Californian Nudibranchs," Journ. of Malacology, xii., 1905, p. 48, pl. viii., figs. 12-16.

III. PROCTONOTUS, A. et H.

Alder et Hanc., *Nudibr. moll.*, Part ii., 1845. Fam. 3, pl. 42.

Rhinophoria simplicia, crista interrhinophorialis nulla; anus dorsalis.

Margo masticatorius non dentatus. Radula multiseriata.

1. *Pr. mucroniferus*, A. et H.

M. Atlant.

IV. MADRELLA, A. et H.

A. et Hanc., *Notice, l.c.*, v., 3, 1864, pp. 141-142.

Vayssière, *Rech.—sur les Opisthobranches*, 1903, pp. 88-92.

Rhinophoria papillata, crista interrhinophorialis nulla; anus lateralis.

Margo masticatorius non dentatus. Radula triseriata.

1. *M. ferruginosa*, A. et H.

Eliot, *Nudibranchs from Zanzibar*, i. *l.c.*, 1902. p. 71. pl. vii., figs. 14-16.

M. Indic.

2. *M. aurantiaca*, Vayss.

M. Mediterr.

JANOLUS CAPENSIS, B. n. sp.

Pl. VII., figs. 6-21.

One specimen was procured at "Rocky Bank," False Bay, by dredge (17-27 fms.) on rocky bottom, October 8, 1902; it was rather hardened.

It was 3 cm. long by a breadth of 1.5 and a height of 1.3 cm.; the height of the rhinophoria 5 mm., the length of the tentacles 3, the height of the dorsal papillæ 4 and of the anus 3 mm.; the sides of the body at the middle 5 mm. high; the breadth of the foot 12 mm., of its brim 2 and the length of the tail 2 mm.—The animal was uniformly coloured whitish yellow; the papillæ and the anus nearly colourless, semi-pellucid. The liver shone brownish through the back and the intestine whitish.

The form of the body as in other Janidæ. The mouth tube was turned up, the anterior of the bulbus pharyngeus somewhat prominent, the form of the head rather broad and its tentacles finger-shaped; the relations of the head to the foot quite as in other Janidæ.* The inter-rhinophorial crest median on the neck, not

* Cf. R. Bergh, "Beitr. zur Kenntn. d. Æolidiaden," 1. 1874, *l.c.*, p. 599, tab. vii., fig. 1b.

strong, somewhat compressed, the upper margin with several slight transverse furrows. Close to the crest the (scarcely retractile) not short-stalked rhinophoria; the club rather slender, with about 18–20 rather stout lamellæ and a rounded end papilla (fig. 7). The even back somewhat convex; the margin not very prominent, 1–3 mm. broad, densely set with perhaps 3–4 indistinct series of rather small papillæ; this margin in front reaching beyond the rhinophoria, only interrupted in the middle of the anterior and the hinder end of the back. The papillæ (*epinotidia*) as in other Janidæ placed without order, small; the outer quite small, the inner somewhat larger; here and there a solitary papilla was seen in the neighbourhood of the margin. The papillæ seemed nearly all present, and there was no trace of dropped larger ones. The papillæ of usual form, sometimes a little nodular (fig. 6). Quite posteriorly on the back, 3 mm. from its end, and submedian, still nearer to the right margin, the anal papilla, directed forwards, gaping, with strong folds (fig. 8), at its base behind a fine renal pore. The sides rather high, the genital papilla with two openings. The foot scarcely narrower than the back, the margin prominent, the tail short.

The *central nervous system* yellowish, nearly as in the *Janolus australis*, the large pedal ganglion lying on the outside of the cerebro-pleural.

The narrow lip disc with strong cuticle. The (fig. 11) huge *bulbus pharyngeus* 11·5 mm. long by a breadth and a height of 7 mm., in shape as in other Janidæ, the blackish anterior end of the mandibles projecting in the inner mouth; its sides are quite covered by the mandibles; on the somewhat concave upper and on the convex under side the strong (faintly reddish) yellowish transverse muscles, the hinder end formed by the lingual musculature. The mandibles (figs. 9–16) very powerful, their thickness in front and in the middle 3 mm.; the colour of the thicker parts mahogany brown, in the fore end and in the hinge blackish, the thinner parts reddish yellow; their length and their height equals that of the bulbus. They consist of a little shorter but stronger anterior part, flattened in the fore end, and a longer slightly quadrangular posterior. The anterior convex part has on the *outside* (figs. 10, 13) a deep somewhat curved perpendicular furrow for muscular insertion; before this the mandible is thicker, more convex, behind the furrow the part is more flattened. The longer posterior part is by a deep longitudinal furrow and border (also for muscular insertion) divided in two lips, a thinner superior and thicker inferior, somewhat concave beneath. The *inside* of the mandible shows (figs. 9, 11) the anterior part convex, prominent, before passing into the smaller foremost part of the outside, above

continued in a prominent black, even, connecting process. This anterior part is separated by a deep furrow from the posterior, that also through a longitudinal cleft and border is divided into two lips, a higher inferior and a lower and thicker superior, that is continued in the anterior part. The inferior edge of the mandible is quite even (figs. 9, 10). Above, the jaws are connected with a thick nearly black cuticle, consisting of longitudinal halves corresponding to the jaws. Below at the entrance into the mouth is a little yellow (black in front) lamina (fig. 11), 3 mm. broad, 2 long, with a crest in front (fig. 14) on the upper side. The thickness of the *M. transversus mandibularum* here 3·5 mm. Behind the *M. transv.* pass in two cartilaginous-looking strong plates (figs. 15, 16) of cellular structure with large clear round cells.—The narrow mouth cavity is filled by the short and keel-shaped *tongue* with broad reddish brown rasp. This last contained about 18 series of plates, in the sheath, moreover, at least 24 rows, the total number being thus probably 42. The rows seemed to contain about 50 lateral plates. The plates were all yellow at the basal part, otherwise nearly colourless; the length of the lateral plates rising to about 0·4 mm. The median plates narrow, with a weak pointed hook (fig. 17). The lateral plates quite as in other Janidæ,* rather narrow and slender, the hook a little bent (figs. 18, 19). The whitish salivary glands reaching backwards to the liver.

The œsophagus (fig. 20a) 10 mm. long, by a diameter of 2, with fine longitudinal folds. The presence of a stomach before the liver could not be determined. The large posterior intestinal mass, chiefly formed by the brown liver, somewhat flattened in front, rounded behind, 2 cm. long by a breadth of 1·3 and a height of 1·1 (fig. 20); distinct branches were not seen. In the liver anteriorly a roundish cavity (fig. 20). From this last issues the white *intestine*; for a short distance it perforates the liver, and appears on its under side running submedian backwards (fig. 20), then making a bend, and, further on, running in a furrow of the liver, lies first to the left, then obliquely crossing the liver going backwards on the *right side*, turning upwards (fig. 8) and ending in the anal papilla (figs. 8a, 20); the total length of the intestine about 5 cm. by a breadth of 3–4·5 mm.—The *contents* of the cavity of the liver and of the intestine white, consisting of hard masses of calcareous Bryozoa.

A ramification of the brownish black liver could not be ascertained or followed. The *epinotidia* (fig. 6) on the margin of the back were

* The number of series of plates was in *Jan. hyalinus* 16 (8 + 8), in *J. australis* 24 (16 + 8), the number of lateral plates in the rows in the former 12–13, in the latter up to 54.

slightly nodular, over the middle of their height a blackish gray mass shone through, up to this rose a thin-walled even tube; the point of the organs often flattened, and with a follicle.*

The renal mass behind the liver "being a network of tubes" † as in other Janidæ.

The *hermaphrodite gland* yellowish, lying to the right, embraced by the transverse and descending part of the intestine (fig. 20), roundish in circumference with a diameter of 10 mm., 6 mm. thick; the under side distinctly divided into some large lobes radiating from the centre; the thin whitish efferent duct issues from this deep centre. In the whitish lobules ripe genital elements. The *anterior genital mass* yellowish and yellow brown, somewhat compressed, 7 mm. long and high by a thickness of 5, on its inside a large coil of windings of the ampulla of the hermaphrodite duct; the white seminal vesicle, globular, 2 mm. in diameter. The yellowish *penis* (fig. 21) nearly cylindrical, its upper end recurved, 12 mm. long by a diameter of 2, consisting of the præputium, that shows many folds of the inside and at the bottom of its cavity a small whitish glans.

This form is certainly specifically different from the other known Janoli, in the epinotidia and its distinctive mandibles.

Off Capé Port Lighthouse (SW. by W., $4\frac{1}{2}$ miles) a specimen very likely of the same species was procured by shrimp-trawl (December 5, 1902) from a depth of 29 fms. on fine sand bottom. The epinotidia are said to have been "red tipped."

The specimen had a length of 3.5 cm. and resembled the former, only the epinotidia had fallen off (not being left in the bottle) with the exception of those of the outermost series, where they had a length of 0.5–1.25 mm.

The *bulbus pharyngeus* 13 mm. long by a breadth of 11 and a height of 4.5. The mandibles not so high and the furrows on the outside and inside not so deep. The lingual plates longer than in the former specimen. The œsophagus, the intestine and the liver as described.

The position and form of the hermaphrodite gland as well as the anterior genital mass as described.

An additional specimen was procured off Buffalo Bay "by shrimp-

* According to Alder and Hancock (*l.c.*, Part 5, 1851) a distinct external orifice was visible in the living state in *Antiopa cristata*. Cf., too, my "Beitr. zur Kenntn. der Æolidiaden," I., *l.c.*, 1874, *l.c.*, p. 604, note 3.

† Alder and Hancock, *l.c.*, pl. 43, fig. 1, ii, *hh*.

trawl from a depth of 30 fms. and from sandy bottom with stony Polyzoa," it was very hardened; two others were taken in False Bay from rocky bottom with many sponges.

The length of the two largest was 3-3.5 cm. by a height of 0.8; the height of the rhinophores 5 mm., of the tentacles 2, of the epinotidia 0.5-3; the back 1 cm. broad, the foot 1.2, the marginal furrow continued along the side of the foot for 8-9 mm., the length of the tail 4.

The epinotidia in 2-4 series; the inter-rhinophorial crest very small; the anus submedian, 2 mm. high.

The *bulbus pharyngeus* 14-16 mm. long by a breadth of 9-9.5, and a height of 7-7.5, the furrows of the posterior part of the mandibles replaced by a thick edge (fig. 13); in general the forms of these organs is rather variable in different specimens, the thickness of the mandibles in front and in the middle of their length 3.5 and 4 mm. The *tongue* 3 mm. high and long, the length of the rasp-sheath 4-5 mm. (its long nearly horizontal pulpy end 2 mm. long). In the rasp about 18-20 rows of plates, and in the sheath 22-24; the number of plates in the series could not be determined. The plates as above.

GLAUCIDÆ.

R. Bergh, *System*, 1892, pp. 1035-1036.

GLAUCUS, Forster.

GLAUCUS ATLANTICUS, Forster.

R. Bergh, *Malacolog. Unters.* ii. (Heft xvii.), 1890, p. 876.

One specimen was procured from rock pool, Muizenberg. Its length was with the tail 22 mm.; it agreed in all respects with the type.

TETHYMELIBIDÆ.

R. Bergh, *System d. nudibranchiaten Gasteropoden., l.c.*, iii., 1892, pp. 1039-1043.

Forma corporis quasi ut in *Æolidiidis*. Caput permagnum et cuculliforme; rhinophoria vagina magna retractilia, clavo per-

foliato; tentacula nulla. Epinotidia (papillæ dorsales) colosseæ sine bursis cnidogenis.

Bulbus pharyngeus rudimentarius, lingua et interdum quoque mandibulis destitutus. Hepar solidum vel fortiter ramificatum, ramis papillaribus non validis.—Penis inermis.

This family only contains two genera, Tethys and Melibe.

MELIBE, Rang.

Melibe, Rang, Man. des moll., 1829, p. 129. pl. iii., fig. 3.

Melibe, R. R. Bergh, Malacolog. Unters. i. (Heft 9, 1875), pp. 382–386, taf. xlv.–xlviii.; iii. (Heft 17, 1890), pp. 881–883

Melibe, R. R. Bergh, Beitr. z. Kenntn. d. Japan. Nudibr., i. Verh. d. k. k. zool. bot. Ges. in Wien, xxx., 1880, pp. 160–165; taf. ii., figs. i.–ii.; taf. iii., figs. 1–2.

Melibe, R. R. Bergh, Beitr. z. Kenntn. d. Æolidiaden., l.c., xxxviii., 1883, pp. 688–693; taf. xvii., figs. 13–14; taf. xix., figs. 3–7.

Melibe, R. R. Bergh, Beitr. z. Kenntn. d. Gattung *Melibe*, Rang. Ztschr. f. wissensch. Zool., xli., 1884, pp. 142–152, taf. iii.

Melibe, R. R. Bergh, Gasteropoda opisthobranchiata. Dan. exped. to Siam (Danske Vidensk. Selsk. Skr., xii., 2), 1902, pp. 42–45 (205–209). pl. iii., figs. 6–10.

Chioræra, Gould. Un. St. Explor. exped. Moll., 1852, p. 309, fig. 404.

Corpus nonnihil compressum. Branchiæ (propriæ) nullæ. Podarium angustius.

Bulbus pharyngeus solum lingua destitutus.

These animals, which in some parts of the seas very likely are to be found as frequent as *Tethys* in the Mediterranean, belong only to the warmer and tropic seas. Continued examination will likely reduce the number of the mentioned species, which are as follows:—

1. *M. rosea*, Rang.
Mare Capense.
2. *M. Rangii*, B.
M. rubr.
3. *M. fimbriata*, A. et H.*
M. Indic.
4. *M. ocellata*, B.
M. Indic.

* Eliot, On some Nudibranchs from Zanzibar, l.c., 1902, pp. 68–70, fig. 5.

5. *M. vexillifera*, B.
M. Japon.
6. *M. papillosa* (de Filippi).
M. Japon.
7. *M. bucephala*, B.
M. Siamense.
8. *M. capucina*, B.
M. Philippin.
9. *M. pilosa*, Pease.
M. Pacific.
10. *M. leonina* (Gould).
M. Pacific.
11. *M. australis*, Angas.
M. Pacific.

MELIBE ROSEA, Rang.

Rang, Man.—des moll., 1829, p. 129. pl. iii., fig. 3.

Pl. IX., figs. 1–12.

At Woodstock Beach, Table Bay, 10 individuals of this form were procured, of which 2 were dissected.

They varied in length from 1·5–3·8 cm. The largest was very hardened, the cowl-shaped head quite contracted, and all the papillæ of the back fallen off. Two other specimens were 3·2 cm. long by a breadth of the body proper of 0·8 and a height of 1·2; the head 11 mm. broad and 11 mm. long on the upper side, beneath merely 3 mm. long; the stalk of the rhinophores 2 mm. high, the epinotidia of the back up to 8 mm. in height; the breadth of the foot 4, the length of the tail 6 mm. The animals were uniformly whitish; living they varied according to Prof. Gilchrist from white to yellowish red, usually the latter.

In the form of the body the animal agrees with other *Melibes*. The *large cowl-shaped head* with a little thickened refolded edge provided with 2–4 close-set series of cirrhi (fig. 1), which are conical, somewhat constricted at the base, up to 0·6 mm. high, but often contracted, especially the innermost; the outside of the capuchin shows under a strong lens (fig. 1a) very fine nodules formed of small groups of glandular cells; the thickness of the cowl up to 1 mm.; it showed the muscular bands, circular, and especially longitudinal, very distinctly shining through; the inside of the cowl quite the same as the outside; median in the bottom of its cavity somewhat beneath the centre, the roundish mouth with circular prominent lip, the diameter of the whole region 2·5 mm.;

the lip covered all over with small papillæ. Behind the middle of the length of the cowl the rhinophores, from the bottom of the chalices (with undulated margin), rise the beautiful strong club with about 12 lamellæ and terminal papilla. The even *back* with minimal nodules as the cowl; on its rounded margin in these individuals 8 epinotidia (papillæ) on each side, 4 large, 1 of middle size, and 3 small. These organs (fig. 2) were a little compressed, narrower at the root, pointed towards the end, pronounced nodulous; they adhered rather firmly to their base.* The anal aperture before the second (right) organ more inwards. The *sides of the body* even as the back. The narrow *foot* projected 2 mm. beneath the cowl, of almost the same breadth throughout the whole of its length, the tapering tail rather short.

The intestines were nowhere to be seen from without, which was, however, the case with thin muscular fibres running along the whole length of the sides of the body. The cavity of the body reaching to the region of the last of the larger papillæ.

The *central nervous system* as in other species examined (*M. capucina*).

The outer mouth (already mentioned) leading in the (about 1 mm.) long mouth tube (fig. 3a), on the inside, covered with small cones (fig. 4), of the same kind as on the outer lips. Both the buccal tube and the bulbus pharyngeus are wrapt in a rather closely adhering connective tissue. The length of the *bulbus pharyngeus* 1.5 mm. by a breadth of 2, on its hinder end and beneath a little prominence; through the walls the outlines of the mandibles were very distinctly visible (fig. 3b). The cavity of the mouth with longitudinal folds, but no trace of lingual prominence. The clear-yellow mandibles (fig. 5) resembling those of p. ex. the Tritoniæ or Pleurophyllidiæ; also partly covered by a muscular disc, about 0.65 mm. broad, with a strong connective region and a very plump denticulated masticatory edge, the 10-12 denticles reaching a height fig. 5) up to 0.08 mm.†

The white salivary glands small, uneven.

The œsophagus (figs. 6a, 7a) 6 mm. long, with rather strong longitudinal folds. The *stomach* (figs. 6b, 7b) of a diameter of 3 mm., roundish; through its anterior part shone indistinctly longi-

* The figure of Rang represents 7 pairs of papillæ, the two hinder small.

The smaller papillæ were often set not in pairs, but unpaired in the middle line. The smaller individuals had often only 5 papillæ, of which the 3 larger, 2 paired or unpaired.

† The bulbus pharyngeus with its mandibles agrees very likely in the other species of *Melibe* in general with that of the typical species. Cf. *l.c.*, taf. xlviii., figs. 10-12.

tudinal folds; in this part opened from each side the bile-duct (figs. 6c, 7cc) and a little more backwards the intestine (figs. 6, 7). Through the posterior part of the stomach shone the belt of the *stomachal plates* (figs. 6, 7). This belt was formed of 8 brownish yellow plates of usual form with 1-3 intermedian smaller. The short *intestine* stomach-like dilated in its first part, with several small pocket-like widenings arranged in a series (fig. 6d) on the anterior margin, with fine oblique folds on the inside; from this widened part issues a stronger fold, which with several thinner ones runs through the length of the intestine (fig. 6e). The total length of the intestine 9 mm.—The contents of the alimentary cavity were animal matter with remains of small Hydroids.

The three *principal liver-branches* with their ramified hepatic ducts and the principal branchlets to the dorsal epinotidia as usual, but in these last clearer (not so yellow); the epinotidial hepatic trunks not reaching the point of the organs and their branchlets scarcely entering in the nodules; through the axis of the papillæ moreover two vessels and muscular fibres, which cause the often very notable contraction of the epinotidia. The nodules of these are again finely nodulous (fig. 8), and each of the minimal nodules possesses a few glandular cells.

The net-work of the liver-branches is interwoven with the much branched *renal tubes* (figs. 9, 10), the branches reaching the root of the epinotidia, but did not seem to ascend into them. The renal cells reaching a diameter of 0.025 mm. (fig. 11).

The large yellow lobules of the *hermaphrodite gland* filling a great part of the hinder cavity of the body, wrapped up and often concealed by connective tissue and by closely adhesive hepatic branches and lobules. They were chiefly globulous, of a diameter up to 3 mm., their number only about 20; their structure as usual.

The *anterior genital mass* large, 8.5 mm. long by a breadth of 4 and height of 5, white and yellowish. The yellow hermaphrodite duct long, twisted. The ovigerous duct did not seem to have a "fan-shaped" organ (as in the *M. capucina*). The seminal vesicle small, pear-shaped, 2 mm. in its greatest diameter; the rather strong duct somewhat winding. The globular prostata has the anterior somewhat flattened, and the navel here is deep; it is yellowish, of a diameter of 3.5 mm., finely granulated on the whole of the surface; its duct rather strong, 4 mm. long. The præputium thin, 3 mm. long; the pointed glans (fig. 12) shone through throughout its whole length. The chiefly white mucous gland formed the largest part of the anterior genital mass.

Rang had the type of his genus *Melibe* from the Cape seas. The original specimens do not of course now exist, and since then no *Melibe* has been mentioned from this region. The figure of Rang (he gives no adequate description) does not prohibit an identification with the form here examined, that henceforth very likely will adopt the name of Rang, especially if it shall be found, when living, rosy. It seems different from the *M. Rangii* of the Red Sea, and can scarcely be identified with any of the other described species.

PLEUROPHYLLIDIIDÆ.

R. Bergh, *System*, *l.c.*, pp. 1060–1064.

The family contains the genera *Pleurophyllidia* (proper) of Meckel, the *Lingvella* of Blainville, and *Camarga* of Bergh.

PLEUROPHYLLIDIA, Meckel.

R. Bergh, *System*, *l.c.*, pp. 1063–1064.—*Die Opisthobranchiata d. Siboga Expedition*, 1905, *l.c.*, pp. 213–215.

A number of species is known, chiefly from the warm and from the tropical seas.

1. *PL. CAPENSIS*, B. n. sp.

Pl. VIII., figs. 23–24.

One individual was procured about 16 miles W. of East London by large trawl from a depth of 37–39 fms.

The *length* of the rather contracted and hardened animal was 5 cm. by a breadth of 3.3 and a height up to 2.5; the breadth of the dorsal brim up to 1.4 cm.; the length of the gill 1, the height of its leaves 4 mm., that of the lateral lamellæ up to 3.5 mm., the breadth of the head (tentacular shield) 2 cm.; the breadth of the foot 2.2 cm., of its brim up to 7 mm., the length of the furrow of the tail 8 mm. by a breadth of 2.5.—The ground *colour* of the back was black, but supplanted by the light yellowish longitudinal folds; the neck with the rhinophores black (with whitish point), the tentacular shield black; the gill bright-grayish, the lateral lamellæ bright dirty yellowish, the sides of the body grayish black, the foot nearly black, the tail-furrow white.

The form as a whole, the usual. No proper nuchal caruncula, the rhinophores 5 mm. high, as usual; the dorsal folds as usual, rather regularly alternating in thickness, their number at the middle of the

length of the back about 30. The lamellæ on the under side of the brim of the back numerous, especially at the thin and narrow margin; the larger ones, in number about 30, descending obliquely from the narrow margin forwards; the margin proper of the back showed no openings of cnidophore sacs. The sides low; the genital and renal opening as usual, as also the rather prominent anal papilla. The margins of the rather strong caudal furrow prominent.

The whitish *bulbus pharyngeus* 12 mm. long by a breadth and a height of 11. The yellowish *mandibles* united 10 mm. long and broad, the height of the convexity 4 mm.; their inner half much thicker than the outer; the mandibular process as also the whole of the *masticatory edge straight and quite even*. The rasp of the *tongue* yellow, containing about 25 series of teeth, in the sheath moreover about 33 series, the total number being thus 58. In the lateral series about 50 plates. The plates were yellow and yellowish; the breadth of the median plates 0.30 mm., the height of the first lateral 0.08, of the fifth 0.28, and this height was scarcely surpassed. The *median plates* broad (fig. 23), with short hook and on each side *about 10 denticles*; the lateral plates also of usual form, mostly with 4-6 very small denticles (fig. 24), the outermost mostly without these.

The upper salivary glands (gl. salivales) as usual; the under (gl. ptyalinæ) very strong.

The œsophagus and the stomach as usual; the intestine 3 cm. long by a diameter of 2-2.5 mm., in the rectum some dark animal matter. The liver ramifications in the lateral laminæ as usual. No cnidocysts could be found; but in the narrow margin of the back fine gland-openings.

The large hermaphrodite gland dirty brown, 18 mm. long by a breadth of 12 and a height of 10; the ampulla of the hermaphrodite duct brown. The large anterior genital mass white and whitish, 15 mm. long by a height of 8 and a breadth of 7 mm.; the seminal vesicle large.

This species seems different from others known from the coast of Africa, from the *Pl. natalensis*, B., *Pl. Petersi*, B., and perhaps from the *Pl. Horatii* of Eliot.* The mandibles have a straight, even masticatory edge, the lateral plates of the rasp have mostly

* Eliot, "On some Nudibranchs from East Africa and Zanzibar," ii. Proc. Zool. Soc. of London, 1903, i., pp. 251-252.

The description of this species (given by Crossland) is not at all clear; the assertion of Eliot that the gill is wanting is very doubtful; the median plates have a long cusp, and the cnidocysts are distinct.

some few denticles, the nuchal region is even (and the margin of the back without cnidocysts).

2. PL. GILCHRISTI, B. n. sp.

Pl. VIII., figs. 14–18.

Of this form one individual was procured off Sebastian Bluff (July 11, 1900) from a depth of 40 fms. by shrimp-trawl, two off Cape St. Blaize from muddy bottom and a depth of 35 fms. by large trawl, and one more off Cape Point Lighthouse.

The three last had a length of 20 and 27 mm. The first, which was thoroughly examined, was 24 mm. long by a breadth of 15 and a height of 8 mm., the tentacular shield 9 mm. broad; the brim of the back mostly 4·5 mm. broad, the length of the gill 4·5; the breadth of the foot 12, the length of the (not very pronounced) furrow of the tail 4 mm.—The ground colour of the back grayish, more blackish in front, the folds whitish, otherwise the animal seemed to be uniformly white.

The lateral lamellæ as above, in number about 40, about half of which were larger; no cnidal pores or bags were seen. The neck without caruncle, folds, or papillæ.

The anal papilla formed a prominence 5 mm. in height.

The central nervous system as usual. The otocysts 0·06 mm. in diameter.

The *bulbus pharyngeus* 3·5–4 mm. long by a breadth and a height of 2·5. The *mandibles* of a length of 3 mm. by a breadth of 2·8, their masticatory edge yellow, elsewhere nearly colourless; the *masticatory margin* (fig. 14) with (about 10) series of very small *blunt cones* of a height of about 0·025 mm. (in two individuals). The very bright yellowish rasp of the *tongue* contained, in the two individuals examined, 22 and 25 series of plates, in the sheath moreover were counted 23 and 21, the total number of series being thus 45–46. In the lateral series (of three individuals) 41, 33, and 35 plates. The plates rather pale; the breadth of the median 0·17–0·18 mm., the height of the first lateral 0·12, of the next 0·16, rising to 0·18, that of the outermost about 0·10 mm. The *median plates* had 4 *strong denticles* on each side (fig. 15), the first lateral with (fig. 16) 6–8 not quite small denticles, the plates of about the inner third or eighth part of the rasp provided with a few very fine denticles (fig. 16), the rest without denticle (fig. 17).

This form is different from the preceding and does not seem to agree with any one of the hitherto known species.

3. PL. EUCHROA, B. n. sp.

Pl. VII., figs. 1-5; Pl. VIII., fig. 25.

Two specimens of the form were procured, both by shrimp-trawl; one taken from a depth of 50 fms. (green mud) off Cape Hang Klip; the other from sandy bottom at a depth of 30 fms. in Buffalo Bay. A third individual was dredged off Cape Point Lighthouse, and two at Seal Island from a depth of 16 fms. and a sandy bottom with shells.

The first two were about of the same size and appearance. Their length was 17 mm. by a breadth of 9-10 and a height of 6-7; the breadth of the frontal veil 5, of the brim of the back 4 mm., the length of the gill 2 by a breadth of 1.75 mm., the breadth of the foot 7 mm., of the caudal furrow 3-4 mm. The two last-mentioned individuals were 3 cm. long (not dissected).—The ground colour of the back dark gray or blackish with whitish lines, the colour otherwise whitish or yellowish.

Of the usual form, behind the frontal veil perhaps a small caruncle; the margin of the back with a series of fine sometimes grayish cnidocysts, their contents sometimes projecting. The lateral lamellæ obliquely set, in number about 40.

The *bulbus pharyngeus* in 4 individuals whitish, 3.3-4 mm. long by a breadth of 3.3-5 and a height of 3. The mandibles thin, yellowish, about as in *Pl. Gilchristi*, the height of the columns of the masticatory edge about 0.04 mm., of which the blunt end projected 0.01 mm. high. The nearly colourless or dirty yellowish rasp of the *tongue* contained 18 rows of plates, in the sheath 27, the total number of series being thus 45; in the series on each side about 25 plates. The plates yellowish; the breadth of the median 0.14 mm.; the height of the two outermost lateral 0.06-0.08 mm., rising to 0.20. The median plate (fig. 25) had on each side 5 strong denticles and a small one on the short pointed hook; the first lateral plate with a series of fine denticles (fig. 1), all the other (figs. 2, 3) without denticles (as in the *Pl. natalensis*).

The cnidæ as usual. The anterior genital mass dirty yellowish, of meniscus form. In three individuals the pointed penis (fig. 5) projected 5.5 mm. from the genital papilla or everted vestibulum (fig. 4).

To the same species very probably belong a large individual procured by large shrimp-trawl about 20 miles W. of East London from a depth of 37 fms.

It had a length of 4.5 cm. by a breadth of 1.8 and a height of 1;

the tentacular veil 10 mm. broad; the breadth of the foot in front (with its angles) 20 mm.; the length and the breadth of the gill 5 mm.—The ground colour of the back black, but the colour reduced by the white longitudinal ribs (in number at the foremost third about 25); the colour otherwise whitish.

The foremost lamellæ horizontal, the rest obliquely set as usual; on the brim of the back very pronounced cnidocysts. The caudal furrow very pronounced, yellow, 13 mm. long by a breadth of 1.25.

The *bulbus pharyngeus* (projecting freely 8 mm.) whitish, 9 mm. long by a height and a breadth of 6. The mandibles yellow, rather strong; the masticatory edge had about 15 series of scarcely prominent roundish quadrangular facets of a diameter up to 0.025 mm., belonging to columns of a height up to 0.04. In the yellowish rasp of the *tongue* 22 series of plates, in the sheath 34, the total number of rows thus being 56; the number of plates in the series seemed to rise to 32. The median teeth 0.29 mm. broad, their hook with a little denticle on each side, more outwardly 6–7 coarser denticles on each side. The lateral plates quite as above, reaching a height of 0.30 mm.

This form seems specifically different from the foregoing. Of the hitherto known species of Pleurophyllidiidæ only *Pl. natalensis*, *cygnea*,* and *Mülleri*† show the margin of the lateral plates (with the exception of the first always finely denticulated) even (not denticulated), but from these species *Pl. euchroa* seems to differ by different character of the masticatory edge of the mandibles.

4. PL. MICRODONTA, B. n. sp.

Pl. VIII., figs. 17–22.

Off Constable Hill (NNE. 6½ miles) one specimen was taken by large trawl from a depth of 33 fms. and green mud bottom. It was in a very bad state of preservation, very hardened, somewhat contracted and bent.

The length seemed to have been 3 cm. by a breadth of 1.5 and a height of 1. The ground colour of the back seemed to have been black, the whitish lines as usual.

A caruncle before the rhinophores could not be detected. The gill, the lateral lamellæ, and the cnidocysts as usual.

The length of the *bulbus pharyngeus* 4 mm. by a breadth of 3.5

* R. Bergh, "Neue Beitr. zur Kenntn. d. Pleurophyllidien." Malacozool. Bl., xxiii., 1876, pp. 9–13; taf. 1, figs. 1–7.

† H. v. Jhering, "Zur Kenntniss d. Nudibranchien der brasilianischen küste." Malakol. Jahrb., xiii., 1883, pp. 223–228; taf. 9, fig. 1.

and a height of 3. The yellow mandibles as in the *Pl. euchroa*. The rasp of the *tongue*, clear yellow, seemed to contain 20 series of plates, the sheath about a like number; in the lateral series about 50 plates. The plates yellowish; the breadth of the median 0.075 mm. by a height of 0.05, the height of the thin outermost lateral 0.055. The median plates (figs. 19, 20) with 8-10 denticles on each side of the pointed hook, which had a strong denticle at its root. The lateral plates of common form, with mostly 8-10 pointed denticles (fig. 22), the 10-15 outermost somewhat slender, without denticles.

This form differs from the other, particularly in the very small size of the plates of the rasp.

PECTINIBRANCHIATA.

MARSENIIDÆ.

R. Bergh, *Malacolog. Untersuch.*, iv. (Supplementheft iii., 1, 2), 1886-1887, with 14 plates.

MARSENIA, Leach.

1. MARS. PERSPICUA (L.).

Pl. XIV., figs. 5-9.

A specimen was sent, taken off Umhlanga River mouth by shrimp-trawl. It was somewhat contracted, nearly semiglobular. Later five specimens were fished at Cape Point (N. 50° E., 18½ miles), among which was one male. The largest was 3.3 cm. long by a height of 1.5 and a breadth of 2.7 cm.

The length of the first mentioned, male, specimen was 12 mm. by a breadth of 8 and a height of 5.

The colour of the smooth back was gray with rather numerous more or less large blackish spots; the rest of the body yellowish. The inside of the mantle spotted blackish. The *shell* of usual form, 8 mm. long by a breadth of 6, thin and very fragile.

The form of the body quite as in the typical *Marsenia*. The large penis projected forwards, 6 mm. long.

The buccal tube 2 mm. long. The *bulbus pharyngeus* 2 mm. long, its form quite as usual, the long rasp-sheath rolled up to the right

side. The mandibles 1·5 mm. long, yellow in the anterior part, otherwise nearly colourless (fig. 5), the hinge very pronounced (figs. 5, 6). The *tongue* as usual; the yellow rasp of a breadth of 0·37 mm., containing 12 series of plates; in the sheath moreover 35, of which the 3 hindermost were not quite developed; thus the total number of series 47. The plates very clear yellowish; the breadth of the median plates behind 0·10 mm.; the length of the lateral ones in a straight line 0·22. The median plates (fig. 7*aa*) of usual form; the anterior refolded edge with 2 (–3) denticles on each side of the pointed hook, the legs not quite of the same length. The lateral plates (fig. 7) also of usual form; the pointed hook (fig. 8) showed at the upper edge 12–15 denticles, of which the hindermost 4–5 were much stronger; the lower edge had 4–5 rather weak and blunter denticles.

The œsophagus as usual with a widening. The liver brown.

The *penis* of about the common form, somewhat compressed; from its end the very pointed continuation of the vas deferens projected (fig. 9).

The *larvæ* of the *Marseniæ*, the *Echinospira*, &c., are found widely spread in plankton and carried far and wide by the currents. By far the most of the forms of *Marsenia* described as species, including this form, are probably only local varieties of the *Mars. perspicua*, which seems to be almost cosmopolitan; I have seen such forms collected by Plate on the western coast of South America ("Die Opisthobranchien der Sammlung Plate," Zool. Jahrb., Supplementheft iv., 3, 1898, pp. 564–569), and others collected by Mortensen near the coast of Siam ("The Danish Expedition to Siam," 1. Gastropoda opisthobranchiata, 1902, pp. 213 (55)–214 (56); pl. iii., figs. 13–14).

2. MARSENIA CAPENSIS, Bgh. n. sp.

Pl. IX., figs. 13–16.

Ten individuals of this form (four of which were male) were procured at Cape Point with shrimp-trawl from green mud and a depth of 650–700 fms.; one more at Cape Point by American trawl from a depth of 310 fms. with bottom of sand and black specks; moreover from the same locality 13 specimens from a depth of 700–800 fms. with green mud bottom (6 of 8 examined were male). Three rather large (2·8 (♀) and 3·5 (♂) and 4 (♂) cm. long) were moreover caught off Lion's Head from a depth of 131, 136, 195, 204 fms.

They were all very contracted and stiff.

The length of the dissected individuals varied from 14–18 mm.

the two largest had a breadth of 16 and a height of 8 mm. They were uniformly coloured whitish; on the back rather spread short 0.5 mm. high conical prominences; the shell shone white through the mantle, but always (on account of the strong contraction) broken in pieces. The form of the animal as usual; so too, as far as could be determined, the thin *shell*.

The *bulbus pharyngeus* of usual form, 6 mm. long; the rasp-sheath in two of the three more closely examined (female) individuals rolled up to the right, in the third (male) to the left side. The mandibular plates, 2.5 mm. long, of about the usual form, but the brownish masticatory part not separated by an actual furrow from the yellowish remainder; the anterior narrower margin (in the three individuals) produced in a strong point (fig. 13). On the yellowish rasp 16-17-20 series of plates, in the sheath 25-40-42, the total number of rows being thus 41-57-62; the end of the sheath very little swollen, rounded behind. The thicker part of the lateral plates yellow; the rest as well as the median plates nearly colourless. The breadth of the median plates 0.25 mm., the length of the lateral 0.52. The median plates with curved anterior margin with pointed hook and with about 10 fine denticles on its sides, the posterior margin straight (not bifid) (figs. 14, 15). The lateral plates of usual form, the upper margin of the hook with 8-20 fine denticles, the other with 6-8 coarser.

The liver grayish brown. The large ovarium yellow. The *penis* (fig. 16) 7 mm. long, somewhat flattened, always (by 10 individuals) of quite the same form.

The largest (male) individual 4 cm. long by a breadth of 3.3 and a height of 2; when living it was white; the back was somewhat nodulous; the penis quite as described. The shell very thin, broken.

The *bulbus pharyngeus* 7 mm. long, the rasp-sheath rolled up to the right. The mandibles nearly as above. In the rasp 17 series of plates, in the sheath 49, the total number of rows being thus 66; the plates quite as above.

3. MARSENIA LEPTOCONCHA, B. n. sp.

Pl. IX., figs. 17-20; Pl. X., figs. 1-2.

One male specimen was procured off Cape Point (E. $\frac{1}{2}$, N. 36 miles) from a depth of 700-800 fms. from green mud bottom by shrimp-trawl.

The specimen resembled, preserved in formalin, a somewhat

transparent sphere, flattened on the under side. The length was 6·8 cm. by a breadth of 5·5 and a height of 4; the submedian (inspiratory) cleft 1 cm. long; the breadth of the mantle brim, that was bent downwards and touching the margin of the foot, 13 mm.; the aperture of the gill cavity 9 mm. broad; the length of the tentacles 8 mm., that of the penis 2·6 cm. by a diameter of 0·5; the length of the foot 4 cm. by a breadth of 2·2; the length of the tail 12 mm.—The upper side of the mantle uniformly coloured greenish white, the under side of the mantle (except the broad inspiratory furrow), the neck, and the upper side of the foot velvet black; the tentacles, the penis, and the sole of the foot white; the intestines did not shine through.

The *mantle* was even all over; its under side densely transversely striated, no distinct expiratory furrow. The ophthalmophoria very small, and eyes not visible. The penis strong, nearly cylindrical. The foot as usual.

The *shell* 3 cm. long by a breadth of 2, as in the *Mars. leptolemma* quite thin, membranous, slightly yellowish, easily loosened from the intestines, and when spread in water assuming the ordinary form of the *Marsenia* shell (fig. 1).

The situation of the intestines quite as usual. The olfactory organ (Spengel) 15 mm. long by a breadth of 9, dirty brown with whitish rhachis; the curved gill whitish, about 2·5 cm. long, its very thin and narrow leaves up to 8 mm. high. The ventricle of the heart 5 mm. long; the kidney and the foliated gland exhibited the usual relations and structure.

The *bulbus pharyngeus* of usual form, but small, 6 mm. long by a breadth of 6 and a height of 3·5, whitish. I did not succeed in determining the form of the mandibular plates. The *tongue* as usual; in the faintly yellowish rasp 22 series of plates, in the sheath (that was bent directly forwards and median, reaching to the anterior of the bulbus) 46, the total number of the series thus being 68. The median plates quite colourless, the breadth between their legs 0·22 mm. The median plates narrower in front, with 4–6 sharp denticles on each side of the pointed hook (fig. 18); the lateral plates of the common form on one margin unusually finely denticulated, on the other with 4–6 more clumsy (fig. 2) denticles. The end of the rasp-sheath smaller than usual (fig. 19).

The *oesophagus* as usual and with a widening. On the anterior side of the *psalterium* (the foliated or glandular stomach) the transversely situated second stomach or crop. The psalterium itself semiglobular, somewhat of a cup-like shape, of a transverse diameter of 9 mm., yellowish. The proper (third) stomach as usual. The

brownish liver for the most part covered by the yellowish *testis*, whose large lobes contained ripe zoosperms. The vas deferens formed the usual twisted ball, and was continued forwards first in a straight course; it continued in winding through the penis, and projected a little from its end (fig. 20).

Another, a female and somewhat smaller, specimen was procured off Cape Point (NE. by E. 36 miles), 660–700 fms., green mud.

It was 3·5 cm. long by a breadth of 2·3 and a height of 2·8 cm. The colour was quite as in the male individual, as were also the ophthalmophores. The exerted pharyngeal bulb was (only) examined.

The *bulbus pharyngeus* 6 mm. long by a breadth of 5. The mandibles 3 mm. long, dirty yellowish, in the anterior part dirty brownish, of about the usual form (fig. 17). The rasp of the *tongue* more yellow than in the male specimen, containing 23 series of plates; the sheath bent upwards and forwards in the median line, but not reaching so far forwards, containing 26 series, of which the 5 hindermost were not fully developed; the total number of series thus 49. The plates quite as in the other specimen.

As regards the large size and the membranous condition of the shell this form quite agrees with *M. leptolemma* of the Atlantic.* The colour of the under side of the mantle is, however, quite different, as also the character of the lingual plates, especially that of the median. This form is a new species.

NATICIDÆ.

SIGARETUS, Lmk.

SIGARETUS PLANULATUS, Recluz.

Sigaretus planus, Philippi. Abb. u. Beschreib., i., 1842, p. 146; tab. i., fig. 7.

Sigaretus planulatus, Recluz. *Sigaretus*, Chenu, illustr. conchyl., 1843–1845.

Sigaretus planus, Phil. Troschel, das Gebiss d. Schnecken, i., (1856–) 1863, p. 184; tab. xv., fig. 16.

* R. Bergh, "Nudibranches et Marsenia," Res. scientif., par Albert i., fasc. xiv., 1899, pp. 31–36; pl. i.; pl. ii., figs. 1–5.

Sigaretus planulatus, Recluz. Sowerby, Thesaurus, v., 1887, p. 42.
No. 14, tab. 442, figs. 29-30.

Pl. X., figs. 4-16.

Two specimens were dredged off Umvoti River from a depth of 27 fms. from sandy bottom with shells. They were of quite the same size, now very hardened and very difficult to examine; in the male individual the shell was well preserved, in the female broken in pieces.

The colour was dirty yellowish gray. The length 4 cm., of which the propodium measured 1.7; the breadth of the propodium behind 13 mm., at the anterior narrower.

The milk-white fine *shell* on the middle of the animal 16 mm. long by a breadth of 11 and a height of 5, with a very thin yellowish cuticle. An operculum was not present.

The propodium broader behind, sloping towards the rounded anterior end, flat and even; its straight hinder brim covering the head and the margin of the gill cavity; the propodium is separated by a furrow from the sole; behind this furrow passes in the flatter furrow at the margin of the tail. The hinder foot, the tail is gradually pointed backwards and sloping, rather convex, even, along the margin accompanied by a furrow; its anterior end concave, thinner, and with a height up to 13 mm., reflected on the shell, whose hinder end partly covers its outer lip.

The broad, short *head* (fig. 4) with rather (4 mm.) long tentacles; the intestines shone blackish through the floor of the gill cavity. The nearly cylindrical *penis* (fig. 7) 15 mm. long by a diameter of 1-1.5, with a hollow at the end, from the end of which the spermiduct projected; along the side a superficial furrow. The clear yellow gill (fig. 5) 13 mm. long with a breadth up to 3.25; its fine leaves (fig. 6) free for about half their length. The olfactory organ (Spengel) dirty brownish, nearly as long as the gill by a breadth of 1.25 mm., bent in its anterior end.

The brownish gray *bulbus pharyngeus* of oval form, nearly 2 mm. long. The mandibles nearly reaching each other above and below; brownish yellow, 0.75 mm. long by a breadth of 0.5; their elements as in other *Sigareti*, 0.10 mm. long (fig. 8). The very faint yellowish rasp of the *tongue* containing about 30-36 series of plates; the long sheath (fig. 16) of a breadth of 0.20 mm., bent several times, affixed to the oesophagus and the salivary glands, contained a much larger number; the number of rows seemed in the two individuals to be all in all 131 and 145 (♂). The plates nearly colourless; the breadth of the median 0.13 mm., the height of the lateral plate 0.11, of the

two outer plates 0·115 mm. The median plate (figs. 9*a*, 10–12) broad, in front a little concave and narrower, behind a little convex and with the angles prominent and pointed; the cutting edge with a small median tooth with a stronger one on each side, from the under side a short pointed hook moreover projected (figs. 10–12). The lateral plate upwards bifurcate, the anterior part longer than the posterior (figs. 9*b*, 13).^{*} The outer plates (figs. 14, 15) hook-shaped, the interior a little stronger than the exterior, both a little blunt at the point, the interior (fig. 14*a*) with 3 small teeth, the exterior with but one (fig. 14*b*).

The state of preservation did not admit of an examination of the other organs.

^{*} The figure by Troschel (*l.c.*, p. 185; taf. xv., fig. 16) of the lateral plate seems rather different, but is very likely but incorrectly drawn. It is not quite easy to get the different plates arranged in a convenient position.

Troschel saw in his two individuals 126 and 134 series of plates, and the median plates of a breadth of 0·15 mm.

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„ <i>eusiphonata</i> , B.	9	K	
„ <i>gargantua</i> , B.	5	<i>Kalinga ornata</i> , A. et H.	75
„ <i>Gilchristi</i> , B.	2	M	
„ <i>lobata</i> , B.	8	<i>Melibe rosea</i> , Rang.	96
„ <i>monochroa</i> , B.	13	N	
„ <i>Woodii</i> , B.	12	<i>Nembrotha capensis</i> , B.	68
„ <i>poikilia</i> , B.	10	O	
<i>Archidoris capensis</i> , B.	42	<i>Oscaniella nigropunctata</i> , B.	37
„ <i>granosa</i> , B.	43	<i>Oscaniopsis pleurobranchæana</i> , B.	35
„ (?) <i>scripta</i> , B.	44	P	
B		<i>Philine aperta</i> , L.	24
<i>Berthella granulata</i> , Krauss.	40	„ <i>capensis</i> , B.	27
C		<i>Pleurobranchæa capensis</i> , Vayss. ...	30
<i>Chromodoris albolimbata</i> , B.	55	„ <i>melanopus</i> , B.	33
„ <i>euelpis</i> , B.	56	<i>Pleurophyllidia capensis</i> , B.	99
„ <i>sp.</i>	57	„ <i>euchroa</i> , B.	102
D		„ <i>Gilchristi</i> , B.	101
<i>Diaulula capensis</i> , B.	48	„ <i>microdonta</i> , B.	103
„ (?) <i>morosa</i> , B.	50	S	
<i>Dolabella Rumphii</i> , Rang. var.	15	<i>Staurodoris verrucosa</i> (Cuv.)	46
<i>Doridium capense</i> , B.	29	T	
<i>Doriopsilla capensis</i> , B.	64	<i>Thordisa punctulifera</i> , B.	50
<i>Doriopsis cæsia</i> , B.	62	<i>Triopa lucida</i> , Stimpson.	66
„ <i>callosa</i> , B.	61	<i>Tritonia indecora</i> , B.	85
„ <i>capensis</i> , B.	60	„ <i>pallida</i> , Stimpson.	83
„ <i>sp.</i>	63	<i>Tritonidoxa capensis</i> , B.	87
<i>Doris</i> (gen. ?) <i>glabella</i> , B.	54	Marsenia capensis, B.	
„ „ (?) <i>perplexa</i> , B.	53	„ <i>leptoconcha</i> , B.	106
„ „ (?) <i>pseudida</i> , B.	52	„ <i>perspicua</i> (L.)	104
E		<i>Sigaretus planulatus</i> , Recluz.	108
<i>Euplocamus croceus</i> , Phil. var.	71		
G			
<i>Geitodoris capensis</i> , B.	47		
<i>Glaucus atlanticus</i> , F.	94		

After the printing of a large part of this memoir I received the
“NOTES ON SOME BRITISH NUDIBRANCHS” (Journ. of the Marine
Biological Association, vii., 3, 1906, pp. 333-382, with 2 pl.),
by Sir Charles Eliot,
and
“OPISTHOBRANCHIATE MOLLUSCA FROM MONTEREY BAY, CALIFORNIA,
AND VICINITY” (Bull. of the Bureau of Fisheries, xxv., 1905,
pp. 111-151, with 14 pl.), by Prof. MacFarland.

I therefore have not been able here to use the general and special
notices contained in these papers.

SYNOPSIS OF GENERA AND SPECIES.

Tectibranchiata.

Anaspidea.

Aplysiidæ propriæ.

- Aplysia Gilchristi, B.
- „ allochroa, B.
- „ gargantua, B.
- „ lobata, B.
- „ eusiphonata, B.
- „ poikilia, B.
- „ Woodii, B.
- „ monochroa, B.

Dolabella, Lam.

- „ Rumphii, (Cuv.) Rang. var.

Notarchidæ.

- Aclesia cirrhifera, Q. et G. var.

Cephalaspidea.

Philinidæ.

- Philine aperta, L.
- „ capensis, B.

Doridiidæ.

- Doridium capense, B.

Notaspidea.

Pleurobranchidæ.

- Pleurobranchæa, Leue.
- Pleurobranchæa capensis, Vayss.
- „ melanopus, B.
- Oscaniopsis, Bgh.
- Oscaniopsis pleurobranchæana, B.
- Oscaniella, B.
- Oscaniella nigropunctata, B.
- Berthella, Blv.
- Berthella granulata (Krauss).

Nudibranchiata holohepatica.

Dorididæ cryptobranchiatæ.

Archidoris, B.

- Archidoris capensis, B.
- „ granosa, B.
- „ ? scripta, B.

Staurodoris, B.
 verrucosa (Cuv.).

Geitodoris, B.
 G. capensis, B.

Diaulula, B.
 D. capensis, B.
 D. ? morosa, B.

Thordisa, B.
 Th. punctilifera, B.

Genus ?
 Doris pseudida, B.

Genus ?
 Doris perplexa, B.

Genus ?
 Doris glabella, B.

Chromodoris, A. et H.
 Chrom. albolimbata, B.
 Chrom. eulpis, B.
 Chrom., sp.

Aphelodoris, B.
 Aph. ? brunnea, B.

Porostomata.

Doriopsididæ.

Doriopsis (Pease), Bgh.
 Dor. capensis, B.
 Dor. callosa, B.
 Dor. cæsia, B.
 Dor., sp.
 Doriopsilla, B.
 Dor. capensis, B.

Dorididæ phanerobranchiatæ.

Polyceridæ.

Triopa, Johnst.
 Tr. lucida, Stimpson.
Nembrotha, B.
 N. capensis, B.
Euplocamus, Phil.
 E. croceus, Ph., var. capensis.
Kalinga, Ald. et Hanc.
 K. ornata, A. et H.

Goniodorididæ.

Idalia, Leuck.
 Idaliella amœnula, B.

Nudibranchiata kladohepatica.

Tritoniidæ.

Tritonia, Cuv.
 Tr. pallida, Stimpson.
 Tr. indecora, B.
Tritonidoxa, B.
 Tr. capensis, B.

Aeolidiidæ.

Glaucus atlanticus, F.
Janolus capensis, B.

Tethymelibidæ.

Melibe rosea, Rang.

Pleurophyllidiidæ.

Pleurophyllidia, Meckel.

Pl. capensis, B.

Pl. Gilchristi, B.

Pl. euchroa, B.

Pl. microdonta, B.

Pectinibranchiata.

Marsenia, Leach.

M. perspicua (L.).

M. capensis, B.

M. lepticoncha, B.

Sigaretus planulatus, Recluz.

EXPLANATION OF PLATES.

PLATE I.

APLYSIA GILCHRISTI, B.

FIG.

1. Median plate.
2. Outer end of two series of plates. *aa*, outermost plate.
(Figs. 1-2 drawn by Cam. luc. 200 \times .)
3. A lateral plate. 350 \times .

APLYSIA ALLOCHROA, B.

4. The shell, from above. 3/1.
5. Elements of mandible plate. 350 \times .
6. Median plates.
7. First lateral plate.
8. Outer end of two series. *aa*, outermost plate.
(Figs. 6-8 drawn by Cam. 200 \times .)
9. One of the smaller stomachal plates.
10. Penis. *a*, prostata.

APLYSIA GARGANTUA, B.

11. The shell, from beneath. 3/1.
12. Elements of mandibular plate.
13. Hooks of the palate.
14. A lateral plate.
15. Outer end of a series of plates. *a*, outermost plate.
(Figs. 12-15 drawn by Cam. 200 \times .)
16. One of the inner lateral plates. 350 \times .
17. *a*, Before the cardia region of the masticatory stomach; *b*, facets for masticatory plates.
18. A thorn from the region *a* in Fig. 17.
19. Penis. *a*, region of the glans; *b*, præputium.
20. Hinder end of the præputium opened, the glans exposed.
21. Transverse section of the head of the glans.

APLYSIA MONOCHROA, B.

22. The mantle shield.
23. Elements of the mandibles. 350 \times .
24. Hooks of the palate.



PLATE II.

APLYSIA GARGANTUA, B.

FIG

1. *a*, Oesophagus; *b*, first stomach; *c*, masticatory stomach; *d*, third stomach; *e*, intestine.

APLYSIA MONOCHROA, B.

2. The shell from beneath. 2/1.
3. The penis with *a*, the prostata (?).
4. Median plates.
5. First lateral plate.
6. Outer end of a series. *a*, outermost plate.
7. Outer end of two series. *aa*, outermost plate.
(Figs. 4-7 drawn by Cam. 200 ×.)

APLYSIA LOBATA, B.

8. The shell, from beneath. 2/1.
9. Elements of the mandible.
10. Median and first lateral plate.
11. Outer end of a series. *a*, outermost plate.
(Figs. 10-12 drawn by Cam. 200 ×.)
12. The penis.

APLYSIA WOODII, B.

13. The hinder end of the sole of the foot.
14. The shell from beneath. 3/1.
15. Elements of mandible.
16. Median plate.
17. A lateral plate.
18. The ninth plate from the outer end of a series.
19. Outer end of a series. *a*, outermost plate.
(Figs. 15-19 drawn by Cam. 350 ×.)

APLYSIA POIKILIA, B.

20. Elements of mandible.
21. Hooks of the palate.
(Figs. 20-21 drawn by Cam. 350 ×.)

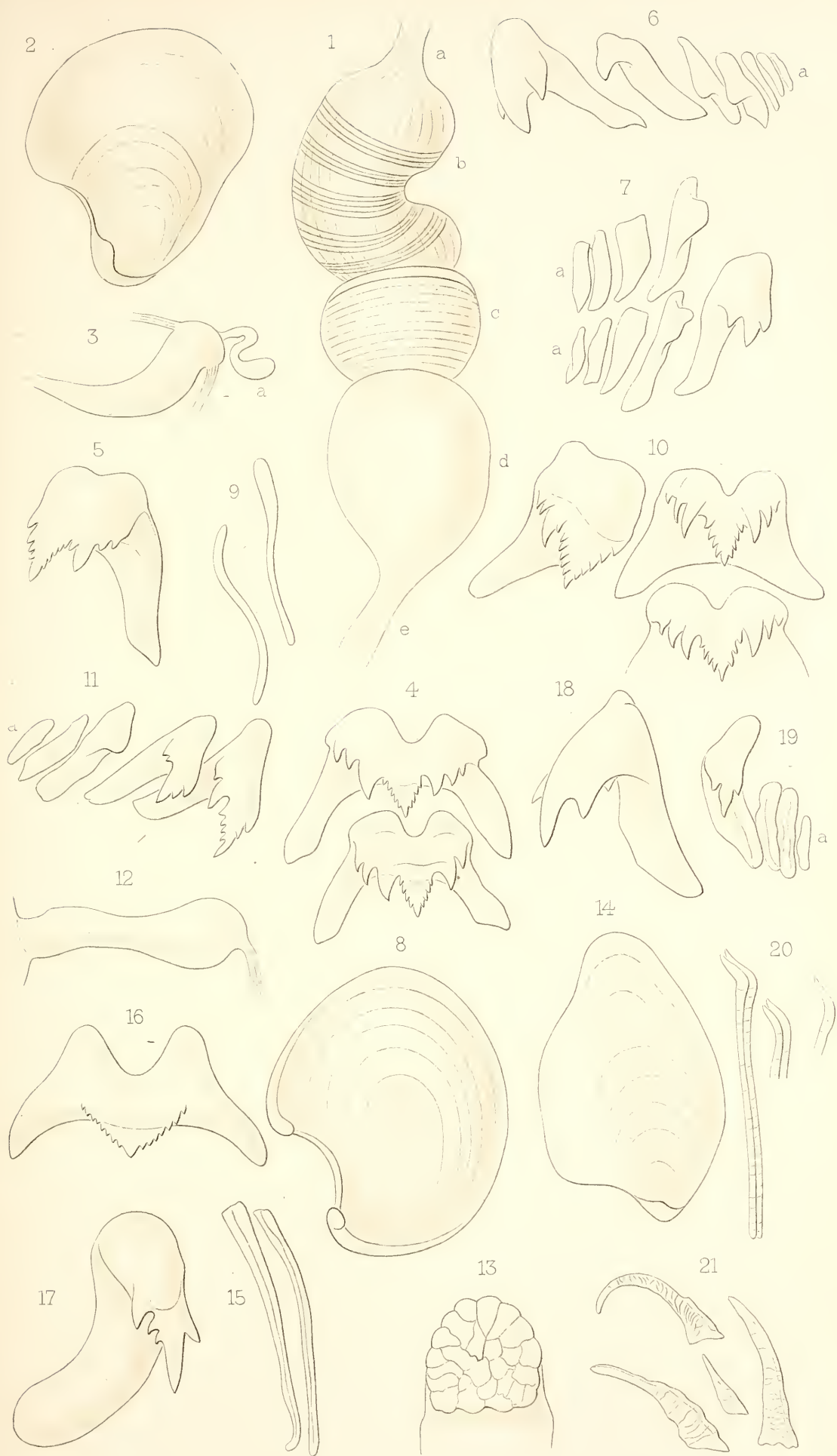


PLATE III.

APLYSIA POIKILIA, B.

FIG.

1. The shell from beneath. 2/1.
2. Median plate.
3. Fifth lateral plate, from within.
4. A lateral plate.

APLYSIA EUSIPHONATA, B.

5. The mantle shield, from above, with siph.
6. The same, from the right side.
7. Elements from the mandible.
8. Hooks of the palate.
9. Median plates of two series.
10. One of the interior lateral plates.
- 11 and 12. Largest lateral plates.
13. Outer end of a series of plates. *a*, outermost.
(Figs. 2-13 drawn by Cam. 200 ×.)
14. Stomachal plates. 55 ×.
15. Penis.

ACLESIA CIRRHIFERA, Q. et G.

16. Mantle region. *a*, rudiment of mantle; *b*, branchia; *c*, anus.
17. Mandible.
18. Elements of mandible. 350 ×.
19. Piece of the palate plate. 350 ×.
20. Anterior end of the bulbus pharyngeus with the rasp.
21. Median and first lateral plates. 350 ×.
22. The penis.
23. The glans.
24. Hook of the penis. 350 ×.



PLATE IV.

ACLESIA CIRRHIFERA, Q. et G.

FIG.

1. Upper margin of the gill (rhachis).
2. *a*, Hermaphrodite duct; *b*, anterior genital mass; *c*, spermatocysta;
d, sperm-oviduct; *e*, spermatotheca; *f*, vulva.
3. From the interior part of the rasp.
4. One of the plates.
(Figs. 3-4 with Cam. 200 ×.)
5. Lateral plate.
6. Lateral plate.
7. Three outermost plates.
(Figs. 5-7 drawn by Cam. 350 ×.)

PLEUROBRANCHÆA CAPENSIS, B.

8. Piece of the mandible, from the side.
9. Piece from the surface.
(Figs. 8-9 with Cam. 350 ×.)
- 10 and 11. Plates of the rasp in different positions. 200 ×.

PLEUROBRANCHÆA MELANOPUS, B.

12. Elements of the mandible, from the side. 200 ×.
13. Piece of the mandible, from the surface.
- 14 and 15. Plates of the rasp, in different positions.
(Figs. 13-15 by Cam. 350 ×.)

OSCANIOPSIS PLEUROBRANCHÆANA, B.

16. Part of the frontal margin.
17. Part of the mandibles. 350 ×.
- 18 and 19. Largest plates of the rasp.
20. Outer end of a series of plates. *a*, outermost.
(Figs. 18-20 with Cam. 200 ×.)
21. Salivary glands with ducts.

OSCANIELLA NIGROPUNCTATA, B. var.

22. Element of the mandible.
23. Innermost plates.
24. Plates from the inner half of the rasp.
25. Plates from the outer half of the rasp.
26. Outer part of a series of plates. *a*, outermost.
(Figs. 22-26 drawn by Cam. 350 ×.)

BERTHELLA GRANULATA, Krauss.

27. Shell from the upper side. 5/1.
28. Piece of mandible. 350 ×.



PLATE V.

BERTHELLA GRANULATA (Krauss).

FIG.

1. Point of elements of mandible.
2. Element from the side.
3. Plate of the rasp.
4. One of the largest plates.
(Figs. 1-4 by Cam. 350 \times .)

PHILINE APERTA (L.).

5. Salivary gland.
6. A plate of the rasp.
7. Upper half of a plate.
(Figs. 6-7 by Cam. 200 \times .)
8. Piece of the denticulation of the hook. 350 \times .)
9. The penis apparatus. *a*, a prostatic gland; *b*, globular sac with duct;
c, cylindrical sac; *d*, præputium; *e*, hammer-shaped glans.
10. The freely projecting hammer-shaped glans. *a*, end of prostatic gland.

PHILINE CAPENSIS, B.

11. The shell.
12. A lateral plate of the rasp.
13. The innermost of the two outermost plates.
14. The outermost.
(Figs. 12-14 drawn by Cam. 350 \times .)
15. A stomachal plate from the inside. 20/1.

ARCHIDORIS GRANOSA, B.

16. Nodules of the back.
17. A plate of the rasp.
18. Outer end of a series of plates. *a*, outermost.

DIAULULA CAPENSIS, B.

19. A piece of the skin of the back. 55 \times .
20. Tubercles of the same.
21. A plate of the rasp.
22. Outer end of a series of plates. *a*, outermost.
(Figs. 21-22 by Cam. 200 \times .)

DIAULULA ?? MOROSA, B.

23. A tubercle of the back.
24. A plate of the rasp.
25. Outer end of a series of plates. *a*, outermost.
26. One of the outer plates.
(Figs. 24-26 with Cam. 350 \times .)

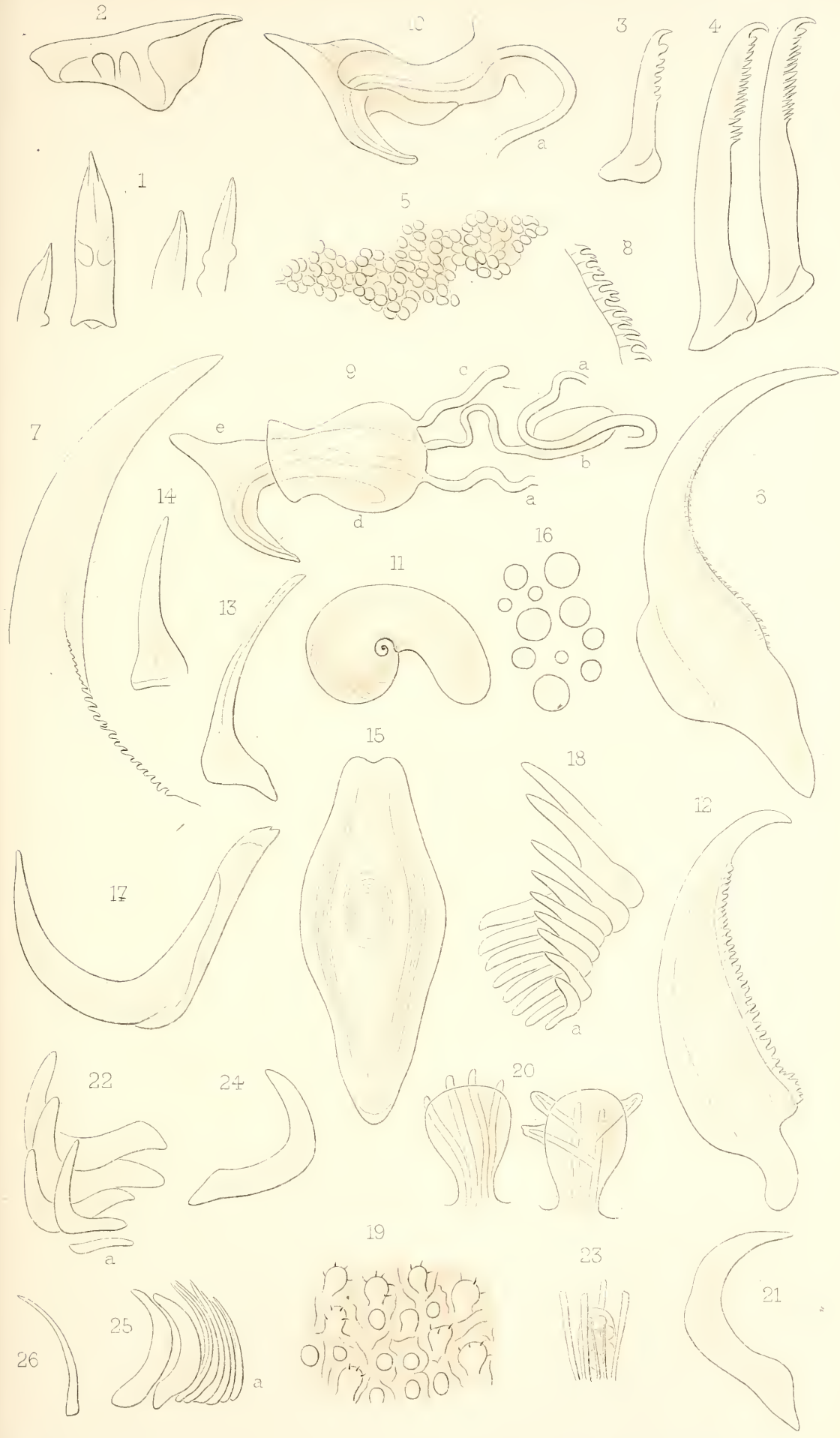


PLATE VI.

THORDISA PUNCTULIFERA, B.

FIG.

1. Piece of the skin of the back.
2. A tubercle of the same.
3. Of the rhachidian part of the rasp.
4. Outer part of two series of plates. *aa*, outermost.
(Figs. 2-4 by Cam. 350 \times .)

DORIS PERPLEXA, B.

5. A plate of the rasp. 200 \times .
6. Outer end of a series of plates. *a*, outermost. 350 \times .

DORIS PSEUDIDA, B.

7. A plate of the rasp. 200 \times .
8. Outer end of a series of plates. *a*, outermost. 350 \times .

DORIS GLABELLA, B.

9. Part of the gill.
10. Part of the armature of the lip-disc.
11. Inner part of a series of plates. *a*, innermost.
12. A plate of the rasp.
13. Part of two series of plates, each with a deformed plate.
(Figs. 10-13 by Cam. 350 \times .)

CHROMODORIS EUELPIS, B.

14. Elements of the lip-disc. 750 \times .
15. Plates of the rasp. 350 \times .
16. One of the largest plates.
17. An outermost plate.
(Figs. 16-17 with Cam. 350 \times .)

CHROMODORIS ALBOLIMBATA, B.

18. A gill-leaf. 55 \times .
19. The bulbus pharyngeus, from the under side, with lip plates.
20. Elements of the lip disc.
21. Part of the middle of the rasp. *aa*, pseudo-plates.
22. Innermost plates of the rasp.
23. One of the largest plates.
24. Outer end of a series of plates. *a*, outermost.

CHROMODORIS, sp.

25. Elements of the lip disc.
26. Plates of the rasp.
(Figs. 19-26 by Cam. 350 \times .)



PLATE VII.

PLEUROPHYLLIDIA EUCHROA, B.

FIG.

1. First lateral plate.
2. A plate from the middle of a series.
3. Outer end of series of plates. *a*, outermost.
(Figs. 1-3 by Cam. 350 ×.)
4. Everted vestibulum with vulva and glans penis.
5. Glans penis. 55 ×.

JANOLUS CAPENSIS, B.

6. An epinotidium.
7. Upper end of rhinophore.
8. Anal papilla with a rectum.
9. Left mandible from the inside. 4/1.
10. The same from the outside.
11. The bulbus pharyngeus, from the under side.
12. Left mandible of another individual, from the inside. 4/1.
13. The same from the outside.
14. Crest anteriorly on the upper side of the lamina between the fore-end of the mandibles.
15. Cartilaginous plates between the hinder end of the mandibles, from the side.
16. The same, from beneath.
17. A median plate of the rasp, from beneath.
18. A lateral plate.
19. One of the largest lateral plates.
(Figs. 17-19 with Cam. 350 ×.)
20. The posterior intestinal mass (liver, &c.), from beneath. *a*, œsophagus.
21. The penis.



PLATE VIII.

DORIOPSIS CALLOSA, B.

FIG.

1. End of the everted glans.
2. Armature in the vas deferens.
3. Spicula of the skin.
(Figs. 1-3 by Cam. 350 \times .)
4. Hinder end of the bulbus pharyngeus. *bb*, salivary glands, between them the buccal ganglia; *c*, œsophagus.

DORIOPSIS, sp.

5. Penis with everted vas deferens. 15/1.
6. Armature of the glans.

DORIOPSISILLA CAPENSIS, B.

7. End of glans.
(Figs. 6-7 drawn by Cam. 350 \times .)

TRITONIDOKA CAPENSIS, B.

8. Fore-end of the animal, from beneath.
9. Mandible, from the inside. 6/1.
10. Masticatory edge, from the inside.
11. Median and first lateral plate.
12. Lateral plates, from the inside and from the outside.
(Figs. 10-12 drawn by Cam. 350 \times .)
13. End of the penis. 100 \times .

PLEUROPHYLLIDIA GILCHRISTI, B.

14. Piece of masticatory edge.
15. Median plates.
16. First and second lateral plates.
17. Outer end of two series of plates.
18. Plate of the inner third of the radula.

PLEUROPH. MICRODONTA, B.

19. Median plates.
20. Denticles of the same.
21. First lateral plate of two series.
22. Hook of lateral plate from the middle of a series.
(Figs. 14-22 by Cam. 350 \times .)

PLEUROPH. CAPENSIS, B.

23. Median plate. 200 \times .
24. Lateral plate. 350 \times .

PLEUROPH. EUCHROA, B.

25. Median plate. 350 \times .



PLATE IX.

MELIBE ROSEA, Rang.

FIG.

1. From the upper side of the cowl with the outer series of cirrhi.
a, nodules.
2. Epinotidium.
3. Bulbus pharyngeus with—*a*, mouth-tube; *b*, region of the mandibles;
c, oesophagus.
4. From the inside of mouth-tube. 350 ×.
5. The mandibles, from the fore-side, the left overlapping the right. 35 ×.
6. *a*, Oesophagus; *b*, stomach with the plates shining through; *c*, left
biliary duct; *d*, pocket-like widenings near the pyloric part of *e*,
the intestine.
7. *a*, Oesophagus; *b*, stomach; *cc*, biliary ducts.
- 8 Surface of one of the nodules of an epinotidium.
9. Ramificated renal tube.
10. End of a renal tube.
11. Cells of a renal tube.
(Figs. 10-11 by Cam. 350 ×.)
12. Last half of the glans penis. 55 ×.

MARSENIA CAPENSIS, B.

13. From the anterior margin of the mandible. 55 ×.
14. Median plate.
15. Median plate from a larger individual.
(Figs. 14-15 by Cam. 200 ×.)
16. The penis.

MARSENIA LEPTOCONCHA, B.

17. Mandible. 9/1.
18. Median plate. 200 ×.
19. End of the rasp-sheath.
20. The penis.



PLATE X.

MARSENIA LEPTOCONCHA, B.

FIG.

1. The shell, from beneath. 1/1.
2. End of the hook of a lateral plate. 200 ×.

APLYSIA GILCHRISTI, B.

3. The animal, when living, natural size and colours.

SIGARETUS PLANULATUS, Recluz.

4. The head with tentacles.
5. A gill leaf.
6. From the structure of the gill leaf. 100 ×.
7. The penis.
8. A piece of the mandible. 350 ×.
9. A piece of the rasp. *a*, median plate; *b*, lateral plate; *c*, outer plates.
200 ×.
10. Median plates, from the upper side.
11. The same, from the under side.
12. The same, obliquely from above.
13. The lateral plates.
14. Outer plates, from the backside. *a*, interior; *b*, exterior.
15. Outer plates, from the side.
(Figs. 10-15 by Cam. 350 ×.)
16. The rasp-sheath.

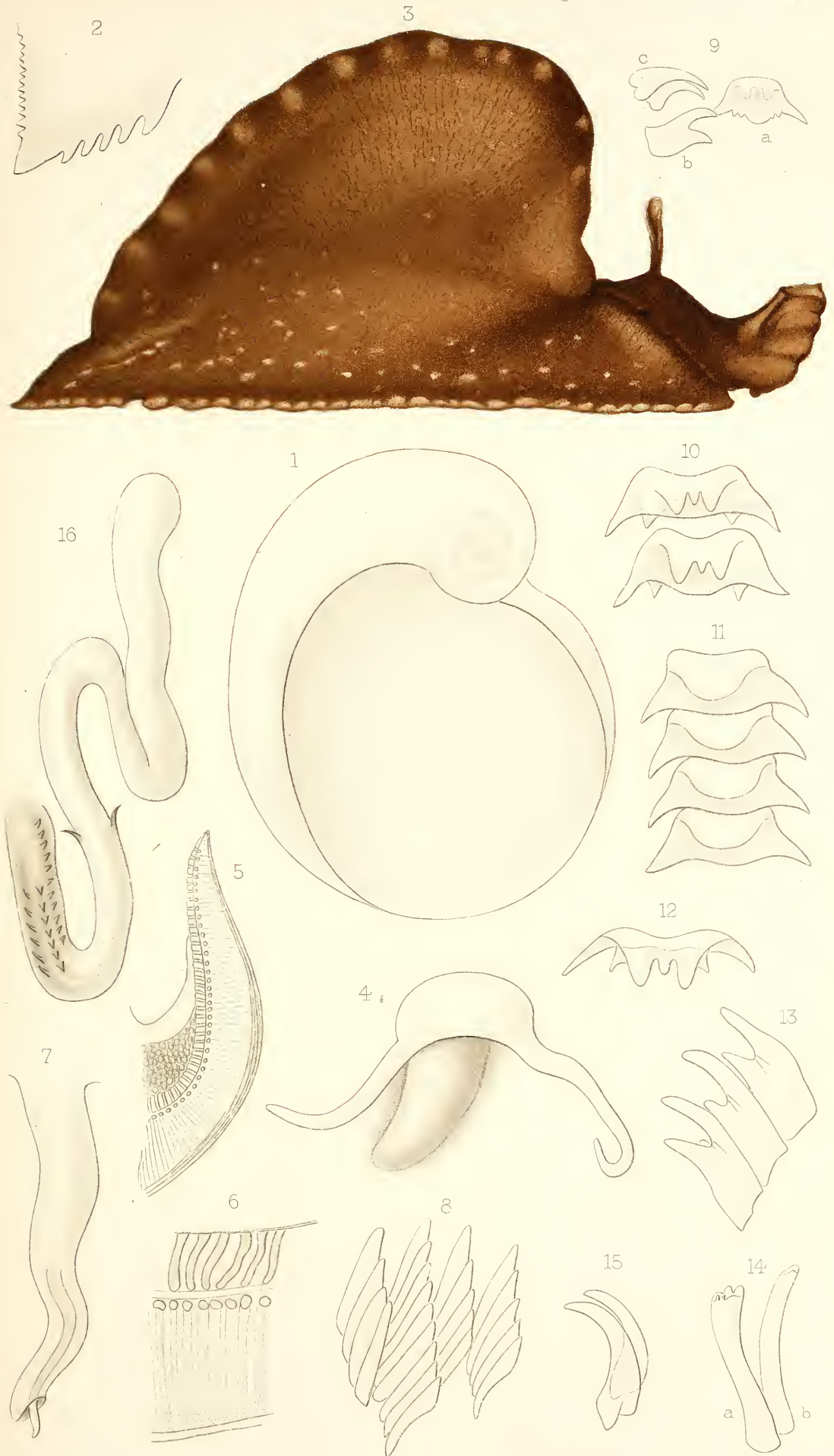


PLATE XI.

PLEUROBRANCHÆA CAPENSIS, Vayss.

FIG.

1. Piece of the mandibular plates, from the side.
2. A piece of the mandibular plate, from the upper end.
3. One of the largest plates of the rasp, from the margin.
4. A similar one from the fore-side.
5. A plate from the middle of a series.
6. Outermost end of a series.

(Figs. 1-6 drawn by Cam. luc. 350 ×.)

7. The præbranchial sac.
8. End of the internal sheath of the vas deferens.

OSCANIELLA NIGROPUNCTATA, B.

9. Squares of the back, partly with black centre.
10. The shell from the upper side. 9/1.
11. Serpent-like filaments of the skin of the back.
12. Element of the mandibular plate, from the upper side.
13. Similar, from the side.
14. Similar, from the under side.
15. Inmost plate of the rasp.
16. Plates of the inner part of the rasp.
17. Largest plate from the middle of the rasp.
18. Outer end of a series of plates. *a*, outermost of 7 plates.

(Figs. 11-18 drawn by Cam. 350 ×.)

ARCHIDORIS SCRIPTA, B.

19. The animal, from the back side. 2/1.
20. Spikel of the skin of the back.
21. Plates of the outer part of the rasp. *a*, outermost.
22. Plate from the median part of a series.
23. Largest plate.
24. Outer end of a series of plates. *a*, outermost plate.

(Figs. 20-24 drawn by Cam. 350 ×.)

25. *a*, Spermduct; *b*, penis; *c*, præputium with glans.

STAURODORIS VERRUCOSA (Cuv.).

26. Plates of the middle of the rasp.
27. Outer end of a series of plates. *a*, outermost plate.

APHELODORIS BRUNNEA, B.

28. Innermost plate of a series of the rasp.
29. Outer end of a series of plates. *a*, outermost.

(Figs. 26-29 drawn by Cam. 350 ×.)



PLATE XII.

APHELODORIS BRUNNEA, B.

FIG.

1. Anterior genital mass. *a*, hermaphrodite duct; *b*, muco-albuminous mass; *cc*, prostata, vas deferens; *d*, vestibulum genitale; *e*, spermatotheca and spermatocysta.

GEITODORIS CAPENSIS, B.

2. Piece of the lip-plate.
3. From the inner part of the rasp. *a*, innermost plate. 200 \times .
4. Plate herefrom.
5. Outer end of series of plates. *a*, outermost plate.
(Figs. 4-5 drawn by Cam. 350 \times .)

TRIOPA LUCIDA, Stimpson.

6. Club-shaped appendix of the back.
7. *a*, First; *b*, second lateral plate; *c*, outer plate.

NEMBROTHA CAPENSIS, B.

8. Bulbus pharyngeus, from the upper side. 4/1.
9. Median plates.
- 10, 11, and 12. Lateral plates in different positions.
13. The outer plates. *a*, outermost.
14. Innermost (first) of the outer plates.
(Figs. 9-14 drawn by Cam. 100 \times .)
15. Hooks of the penis.
16. *a*, Spermatotheca; *b*, spermatocysta.
17. Vestibular gland.

EUPLOCAMUS CROCEUS, Phil., var. CAPENSIS.

18. Head with tentacles and fore end of the foot.
19. Arbuscule of the back.
20. Genital papilla with vulva and end of the penis with prominent armature.
21. Mandibular plate. 12/1.
22. Inner part of the rasp with the three lateral plates; and *a*, the innermost plates of the outer series.
23. End of the glans.
(Figs. 22-23 drawn by Cam. 200 \times .)
24. Hooks of the glans. 350 \times .



PLATE XIII.

KALINGA ORNATA, A. et H.

FIG.

1. Papilla of the back.
2. Tongue with rasp.
3. Plates from above.
4. A plate from the side.
5. Hooks of the glans penis.

(Figs. 3-5 drawn by Cam. 350 ×.)

IDALIELLA AMENULA, B.

6. The animal, from above.
7. The crop of the bulbus pharyngeus, from above. *aa*, glandulæ salivales.
8. Elements of the mandibular plates.
9. From the rhachis of the rasp (lateral plates).
10. *a*, Lateral plates; *b*, outer plates.
(Figs. 9-10 drawn by Cam. 350 ×.)
11. Glans penis with projecting armature. 200 ×.

TRITONIA PALLIDA, Stimpson.

12. Left mandible, from the back side. *a*, masticatory process. 3/1.
13. Piece of the masticatory edge.
14. One of the largest plates.
15. One of the outer plates.

TRITONIA INDECORA, B.

16. One of the inner plates.
(Figs. 13-16 drawn by Cam. 200 ×.)

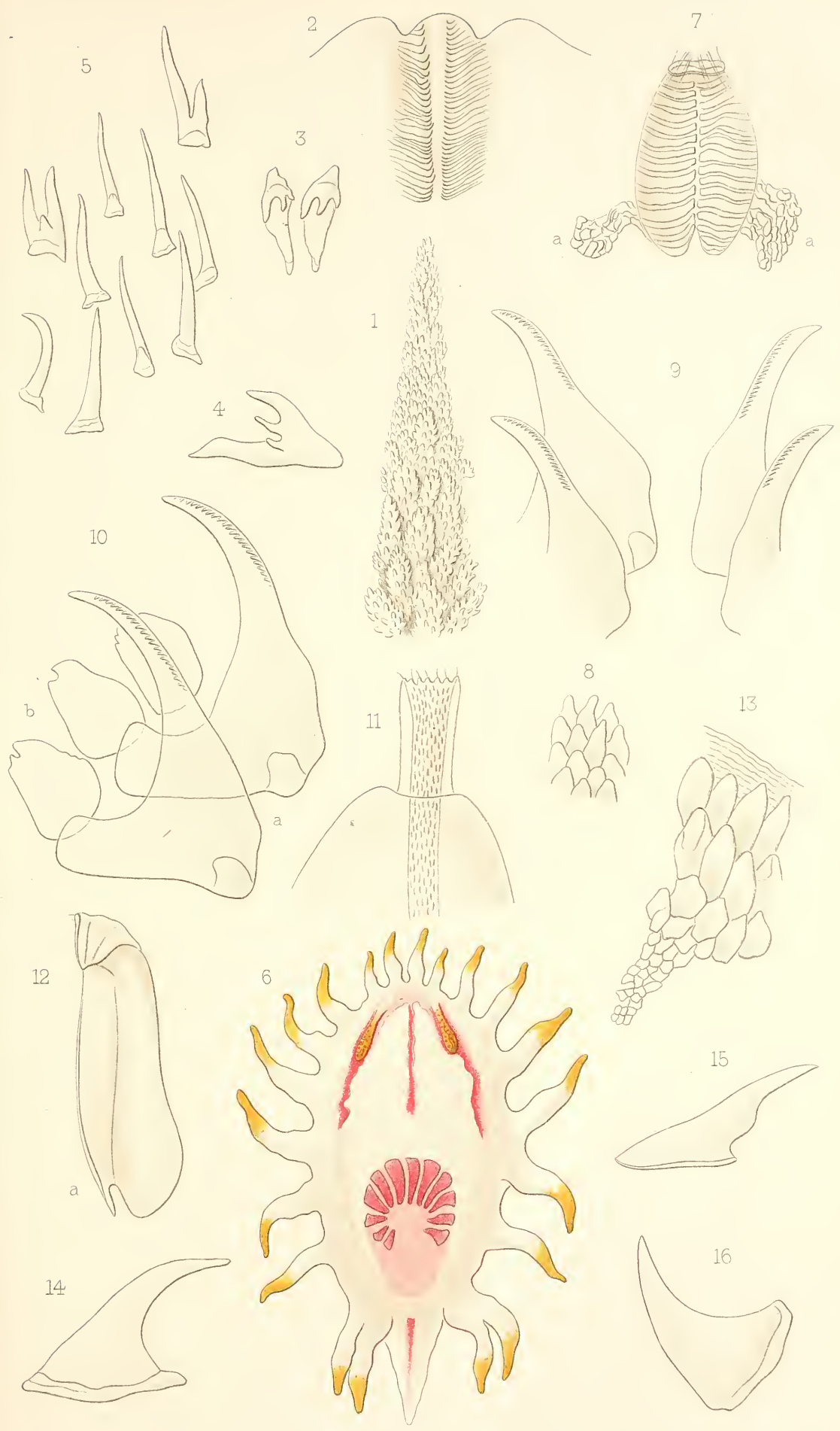


PLATE XIV.

TRITONIA PALLIDA, Stimpson.

FIG.

1. Median and five innermost plates.

TRITONIA INDECORA, B.

2. Median and first lateral plate.
3. Two plates of the outer part of a series.

DORIOPSIS CAPENSIS, B.

4. Hooks of the armature of the penis.
(Figs. 1-4 drawn by Cam. luc.)

MARSENIA PERSPICUA (L.).

5. Mandibular plate. 55 ×.
6. Hinge part of the same. 200 ×.
7. Piece of the rasp.
8. Point of a lateral plate.
(Figs. 7-8 drawn by Cam. 350 ×.)
9. Penis.

DOLABELLA RUMPHII, (Cuv.) Rang.

10. Part of the margin of the hinder disc.
11. A papilla of the back.
12. The shell, from the upper side. 1/1.
13. The nucleus, from the under side.
14. Median plate. 200 ×.
15. Median plate. 350 ×.
16. Lateral plates, from the middle of a series.
17. The two outermost plates.
18. Thorns from the palate.
(Figs. 16-18 drawn by Cam. 200 ×.)
19. Elements of the mandibular plates. 350 ×.
20. Prickles of the cardia of the second stomach.

